MISSOURI
HIGHWAYS and TRANSPORTATION COMMISSION

JEFFERSON CITY, MISSOURI

GENERAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS TO 2004 MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION

Effective April 1, 2006

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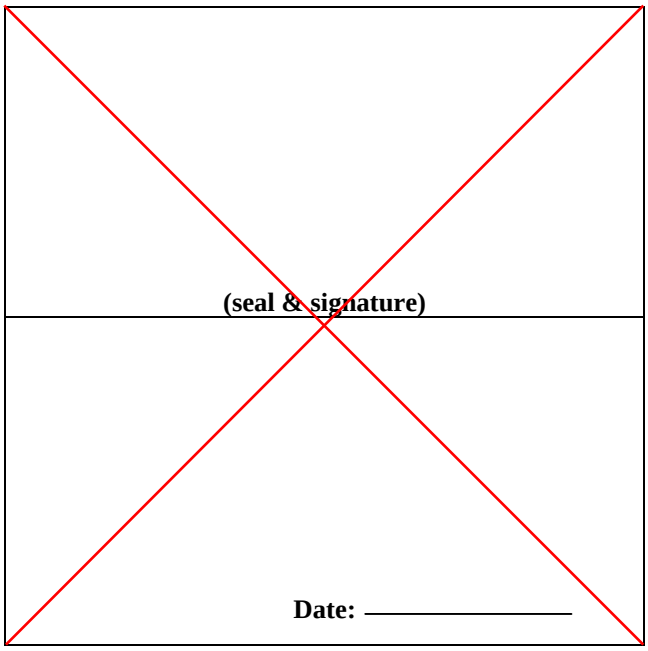

GENERAL PROVISIONS

SECTION 404 NATIONWIDE PERMIT GENERAL CONDITIONS

General Conditions. The following general conditions shall be followed in order for authorization by a Nationwide Permit (NWP) to be valid. Permit authorization from U.S. Army Corps of Engineers (USACE) may have additional conditions that will be binding to the project. The contractor shall refer to the permit authorization letter included in the contract.

1.0 Navigation. No activity shall cause more than a minimal adverse effect on navigation.

2.0 Soil Erosion and Sediment Controls. Appropriate erosion and sediment controls shall be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, shall be permanently stabilized at the earliest practical date. Work within waters of the USA shall be performed, when possible, during periods of low-flow or no-flow.

3.0 Aquatic Life Movements. No activity shall substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams shall be installed such that low flow conditions are maintained.

4.0 Equipment. Heavy equipment working in wetlands shall be placed on mats, or other measures shall be taken to minimize soil disturbance.

5.0 Regional and Case-by-Case Conditions. The contractor's activity shall comply with any regional conditions that may have been added to the contract by the USACE Division Engineer, (see 33 CFR 330.4(e)), and with any case-specific conditions added by the USACE or by the state in the Section 401 water quality certifications.

6.0 Wild and Scenic Rivers. No activity shall occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status.

7.0 Tribal Rights. No activity shall impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

8.0 Endangered Species.

8.1 No activity will be authorized under any NWP that is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or that is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the USACE District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the USACE District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

8.2 Authorization of an activity by a NWP shall not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization from the U.S. Fish and Wildlife Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act.

9.0 Historic Properties. No contractor activity, that may affect historic properties listed, or eligible for listing, in the National Register of Historic Places, will be authorized until the Commission has complied with the provisions of 33 CFR Part 325, Appendix C.

10.0 Section 404 Conditions. In addition to the General Conditions, the following conditions will apply only to activities that involve the discharge of dredged or fill material into waters of the USA, and shall be followed to maintain authorization by the NWPs.

10.1 Water Supply Intakes. No activity, including structures and work in navigable waters of the U.S. or discharges of dredged or fill material, shall occur in the proximity of a public water supply intake, except where the activity is for repair of the public water supply intake structures or adjacent bank stabilization.

10.2 Suitable Material. No activity, including structures and work in navigable waters of the U.S. or discharges of dredged or fill material, shall consist of unsuitable material such as trash, debris, car bodies, asphalt, etc. Material used for construction or discharged shall be free from toxic pollutants in toxic amounts in accordance with Section 307 of the Clean Water Act.

10.3 Mitigation. The project shall be constructed to avoid and minimize adverse affects to waters of the U.S. to the maximum extent practical at the project site.

10.4 Spawning Areas. Activities, including structures and work in navigable waters of the USA or discharges of dredged or fill material in spawning areas during spawning seasons shall be avoided to the maximum extent practical. Activities that result in the physical destruction of an important spawning area, such as excavation, fill or smother downstream by substantial turbidity, will not be permitted.

10.5 Management of Water Flows. Discharges shall not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water, unless the primary purpose of the fill is to impound waters. The structure or discharge of dredged or fill material shall withstand expected high flows.

10.6 Adverse Effects from Impoundments. If the activity creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of the water's flow shall be minimized.

10.7 Waterfowl Breeding Areas. Activities into breeding areas for migratory waterfowl shall be avoided.

10.8 Removal of Temporary Fills. Any temporary fills shall be completely removed entirety, and the affected areas shall be returned to the pre-existing elevation.

10.9 Section 404 Nationwide Permit No. 3.

10.9.1 The repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for the fill in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in material, construction techniques, or current construction codes or safety standards necessary to make repair, rehabilitation, or replacement will be permitted, provided the environmental effects resulting from such repair, rehabilitation, or replacement are minimal. Currently serviceable shall mean useable as is or with some maintenance, but not so degraded as to essentially require reconstruction. The NWP authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced or under contract to commence within two years of the date of the destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the COE District Engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

10.9.2 Discharges of dredged or fill material, including excavation, into all waters of the US to remove accumulated sediment and debris in the vicinity of, and within, existing structures, such as bridges, culverted road crossings, water intake structures, etc., and the placement of new or additional rip rap to protect the structure, provided the permittee notifies the COE District Engineer in accordance with General Condition 13. The removal of sediment shall be limited to the minimum necessary to restore the waterway in the immediate vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend further than 200 feet (60 m) in any direction from the structure. The placement of riprap shall be the minimum necessary to protect the structure or to ensure the safety of the structure. All excavated material shall be deposited and retained in an upland area unless otherwise specifically approved by the COE District Engineer under separate authorization. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the COE District Engineer.

10.9.3 Discharges of dredged or fill material, including excavation, into all waters of the U.S. for activities associated with the restoration of upland areas damaged by a storm, flood, or other discrete event, including the construction, placement, or installation of upland protection structures and minor dredging to remove minor obstructions in a water of the U.S. The NWP applies to activities in waters of the U.S. associated with the replacement of the uplands. The restoration of the damaged areas shall not exceed the contours, or ordinary high water mark, that existing before the damage. Minor dredging to remove obstructions from the adjacent waterbody shall be limited to 50 cubic yards (38 m^3) below the plane of the ordinary high water mark, and shall be limited to the amount necessary to restore the pre-existing bottom contours of the waterbody. The dredging shall not be done primarily to obtain fill for any restoration activities. This permit cannot be used in conjunction with NWP 18 or NWP 19 to restore damaged upland areas. This permit does not authorize new stream channelization or stream relocation projects. Any work authorized by this permit shall not cause more than minimal degradation of water quality, more than minimal changes to the flow characteristics of the stream, or increase flooding.

10.10 Section 404 Nationwide Permit No. 12. Activities required for the construction, maintenance and repair of utility lines and associated facilities in waters of the U.S. shall be as follows.

10.10.1 Utility lines. The construction, maintenance, or repair of utility lines, including outfall and intake structures and the associated excavation, backfill, or bedding for the utility lines, in all waters of the U.S., provided there is no change in preconstruction contours. A ''utility line'' will be defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and radio and television communication. Material resulting from trench excavation may be temporarily sidecast (up to three months) into waters of the U.S., provided that the material is not placed in such a manner that the material is dispersed by currents or other forces. The COE District Engineer may extend the period of temporary side casting, not to exceed a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches (150 to 300 mm) of the trench shall be backfilled with topsoil from the trench. Furthermore, the trench shall not be constructed in such a manner as to drain waters of the U.S., such as backfilling with extensive gravel layers, creating a french drain effect. For example, utility line trenches may be backfilled with clay blocks to ensure that the trench does not drain the waters of the U.S. through which the utility line is installed. Any exposed slopes and stream banks shall be stabilized immediately upon completion of the utility line crossing of each waterbody.

10.10.2 Foundations for Overhead Utility Line Towers, Poles, and Anchors. The construction or maintenance of foundations for overhead utility line towers, poles, and anchors in all waters of the U.S., provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) shall be used where feasible.

10.10.3 Access Roads. The construction of access roads for the construction and maintenance of utility lines, including overhead power lines and utility line substations, in non-tidal waters of the US, provided the discharges do not cause the loss of greater than 1/2 acre (0.20 ha) of non-tidal waters of the U.S. Access roads shall be the minimum width necessary. Access roads shall be constructed so that the length of the road minimizes the adverse effects on waters of the US and as near as possible to preconstruction contours and elevations. Access roads constructed above preconstruction contours and elevations in waters of the U.S. shall be properly bridged or culverted to maintain surface flows. The term ''utility line'' does not include activities which drain a water of the U.S., such as drainage tile, or french drains; however, it does apply to pipes conveying drainage from another area. For the purposes of this NWP, the loss of waters of the U.S. includes the filled area plus waters of the U.S. that are adversely affected by flooding, excavation, or drainage as a result of the project. Activities authorized by paragraph 1.1 through 1.3 may not exceed a total of 1/2 acre (0.20 ha) loss of waters of the U.S. Waters of the U.S. temporarily affected by filling, flooding, excavation, or drainage, where the project area is restored to preconstruction contours and elevation, is not included in the calculation of permanent loss of waters of the U.S. This includes temporary construction mats (e.g., timber, steel, geotextile) used during construction and removed upon completion of the work. Mechanized land clearing necessary for the construction, maintenance, or repair of utility lines and the construction, maintenance and expansion of utility line substations, foundations for overhead utility lines, and access roads is authorized, provided the cleared area is kept to the minimum necessary and preconstruction contours are maintained as near as possible. The area of waters of the U.S. that is filled, excavated, or flooded must be limited to the minimum necessary to construct the utility line, substations, foundations, and access roads. Excess material shall be removed to upland areas immediately upon completion of construction. This NWP may authorize utility lines in or affecting navigable waters of the U.S. even if there is no associated discharge of dredged or fill material (See 33 CFR, Part 322).

10.11 Section 404 Nationwide Permit No. 13. The following bank stabilization activities will be necessary for erosion prevention provided the activity meets all of the following criteria.

10.11.1 No material is placed in excess of the minimum needed for erosion protection.

10.11.2 The bank stabilization activity is less than 500 feet (150 m) in length.

10.11.3 The activity will not exceed an average of one cubic yard per running foot (2.5 m^3 per running meter) placed along the bank below the plane of the ordinary high water mark.

10.11.4 No material is placed in any special aquatic site, including wetlands. Special aquatic sites include wildlife sanctuaries and refuges, wetland, mudflats, vegetated shallow and riffle and pool complexes.

10.11.5 No material is of the type, or is placed in any location, or in any manner, to impair surface water flow into or out of any wetland area.

10.11.6 No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas).

10.11.7 The activity is part of a single and complete project.

10.11.8 This NWP shall not be used for the channelization of a water of the U.S.

10.12 Section 404 Nationwide Permit No. 14. Activities required for the construction, expansion, modification, or improvement of linear transportation crossings (e.g., highways, railways, trails, airport runways, and taxiways) in waters of the U.S., including wetlands, if the activity meets the following criteria.

10.12.1 The discharge does not cause the loss of greater than 1/2-acre (0.20 ha) of waters of the US.

10.12.2 The width of the fill shall be limited to the minimum necessary for the crossing.

10.12.3 This permit does not authorize stream channelization, and authorized activities shall not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality of any stream.

10.13 Section 404 Nationwide Permit No. 15. Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the U.S., including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided such discharges have been authorized by the U.S. Coast Guard as part of the bridge permit. Causeways and approach fills will not be included in this NWP and will require an individual or regional Section 404 permit.

10.14 Section 404 Nationwide Permit No. 23. Activities undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another Federal agency or department where that agency or department has determined, pursuant to the Council on Environmental Quality Regulation for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Part 1500 et seq.), that the activity, work, or discharge is categorically excluded from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment, and the COEUSACE Office of the Chief of Engineers (ATTN: CECW-OR) has been furnished notice of the agency's or department's application for the categorical exclusion and concurs with that determination.

10.15 Section 404 Nationwide Permit No. 33. Temporary structures, work and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites; provided that the associated primary activity is authorized by the USACE or the U.S. Coast Guard, or for other construction activities not subject to the USACE or U.S. Coast Guard regulations. Appropriate measures shall be taken to maintain near normal downstream flows and to minimize flooding. Fill shall be of materials, and placed in a manner that will not be eroded by expected high flows. The use of dredged material may be allowed if it is determined by the USACE District Engineer that it will not cause more than minimal adverse effects on aquatic resources. Temporary fill shall be entirely removed to upland areas, or dredged material returned to the original location, following completion of the construction activity, and the affected areas shall be restored to the pre-project conditions. Cofferdams shall not

be used to dewater wetlands or other aquatic areas changing the use of these areas. Structures left in place after cofferdams are removed will require a Section 10 permit if located in navigable waters of the U. S. (See 33 CFR, Part 322).

SECTION 401 WATER QUALITY CERTIFICATION CONDITIONS

1.0 Description. When a Clean Water Act Section 404 Nationwide Permit is in effect, the contractor is automatically permitted to perform this work under a Water Quality Certification (Section 401) by the Missouri Department of Natural Resources (MDNR). The contractor shall adhere to the following conditions:

1.1 During construction, clearing of vegetation shall be kept to the minimum necessary to accomplish the project.

1.2 Petroleum products, equipment and solid waste shall not be stored after construction working hours below the ordinary high water mark.

1.3 Equipment shall not be operated, except where permitted, nor petroleum products stored in wetlands.

1.4 Riparian areas and stream banks shall be restored to a stable condition as soon as possible after final contouring.

1.5 Work done in streams shall be conducted during low flows whenever possible.

1.6 Petroleum products spilled into any water of the state, or in areas where material could enter waters of the state, shall be cleaned up immediately and disposed of properly.

1.7 The following material shall not be used for streambank stabilization: earthen fill, gravel, fragmented asphalt, broken concrete with exposed rebar, tires, vehicle bodies and liquid concrete, including grouted riprap.

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM REQUIREMENTS

1.0 Disadvantaged Business Enterprise (DBE) Program Requirements. The subsequent Sections will apply only to contracts involving U.S. Department of Transportation (USDOT) federal-aid or federal financial participation. Federal-aid or federal financial participation includes, but is not limited to, any funds directly or indirectly received by MoDOT, or authorized for distribution to or through MoDOT, by the USDOT or any operating administration within the USDOT. These provisions will not apply to Commission contracts funded exclusively with state funds, or state and local funds. Any contractor, subcontractor, supplier, DBE firm, and contract surety involved in the performance of a federal-aid contract shall be aware of and fully understand the terms and conditions of the USDOT DBE Program, as the terms appear in Title 49 CFR Part 26 (as amended), the USDOT DBE Program regulations; Title 7 CSR Division 10, Chapter 8 (as amended), the Commission's DBE Program rules.

2.0 DBE Program Distinguished From Other Affirmative Action Programs. The USDOT DBE Program established by the U.S. Congress is not the same as, and does not involve or utilize, any of the elements or authority of other state or local affirmative action programs, nor does the program rely upon state legislation or gubernatorial executive orders for implementation or authorization, other than the general authority given the Commission in Section 226.150, RSMo. The USDOT DBE Program is implemented by the Commission and MoDOT, through and in conjunction with the FHWA, FTA and FAA, as a "recipient" defined in Title 49 CFR 26.5.

3.0 Policy Regarding DBE Firms. It is the policy of the U. S. Department of Transportation and MoDOT that businesses owned by socially and economically disadvantaged individuals have an opportunity to participate in the performance of contracts financed in whole or in part with federal funds. Consequently, the requirements of 49 CFR Part 26 (as amended) and the Commission's implementing state regulations in Title 7 CSR Division 10, Chapter 8, "Disadvantaged Business Enterprise Program", will apply to any contract with federal funds.

4.0 Opportunity for DBEs to Participate. Each contractor, subcontractor and supplier working on a contract financed in whole or in part with federal funds shall take all necessary and reasonable steps to ensure that DBEs have an opportunity to compete for, and participate in performance on project contracts and subcontracts.

5.0 Required Contract Provision. The federal-aid contract will include the following provision, as mandated by USDOT at Title 49 CFR 26.13(b):

(a) The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of the contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of the contract, which may result in the termination of the contract or such other remedy, as the recipient deems appropriate.

In this provision, "contractor" will be defined as the contractor on the contract; "subrecipient" will be defined as any subcontractor performing the work. For the purposes of any federal-aid contract awarded by the Commission, "the recipient" will be defined as either the Commission, or MoDOT, or both. The contractor shall include this same contract provision in every supply contract or subcontract the contractor makes or executes with a subrecipient.

6.0 Bank Services. The contractor, and each subrecipient on a federal-aid contract, is encouraged to use the services of banks owned and controlled by socially and economically disadvantaged individuals. Such banking services, and the fees charged for services, typically will not be eligible for DBE Program contract goal credit. Any questions on this subject should be directed to the MoDOT External Civil Rights Administrator. See Sec 7.0.

7.0 DBE Program Information. DBE Program information may be obtained from the MoDOT External Civil Rights Administrator, 105 W. Capitol Avenue, P.O. Box 270, Jefferson City, Missouri 65102-0270. Phone (573) 751-6801, Fax (573) 526-0558, E-Mail: **dbe@modot.mo.gov.** It will be the duty of each contractor, for the contractor and for the contractor's subrecipients and surety, to take the steps necessary to determine the legal obligations and limitations under the DBE Program, as an element of responsibility. It will be the duty of each certified DBE firm to know, understand and comply with the DBE firm's legal obligations and limitations under the DBE Program, as a requirement of program participation. A surety providing a bid or contract bond will be bound by those bonds to the duties of the surety's principal.

8.0 DBE Certification, and the Missouri Unified Certification Program. At present, the only DBE firms eligible to perform work on a federal-aid contract for DBE contract goal credit are firms certified by MoDOT. When the Unified Certification Program (UCP) takes effect in Missouri pursuant to 49 CFR 26.81 and 7 CSR 10-8.061, certification of a firm as a DBE by the Missouri UCP will be equivalent to DBE certification by MoDOT.

9.0 DBE Program-Related Certifications Made By Bidders and Contractors. If the bidder makes a written, express disclaimer of one or more certifications or assurances in the bid, the bid will be considered non-responsive. By submitting a bid on any call involving USDOT federal financial participation, and by entering into any contract on the basis of that bid, the contractor makes each of the following DBE Program-related certifications and assurances to USDOT, to the Commission, and to MoDOT:

(a) The bidder certifies that management and bidding officers have reviewed and understand the bidding and project construction and administration obligations of the USDOT DBE Program regulations at Title 49 CFR Part 26 (as amended), the USDOT DBE Program regulations; Title 7 CSR Division 10, Chapter 8 (as amended), and the Commission's DBE Program rules. The bidder further certifies that the contractors management personnel on the project understand and are familiar with the requirements of these federal and state DBE Program regulations; and if the bidder was not familiar with or did not understand the requirements of these regulations, they have contacted the External Civil Rights Unit of MoDOT and have been informed as to their duties and obligations under the DBE Program regulations by MoDOT staff and/or by USDOT DBE Program staff.

(b) The bidder certifies that the bidder has complied with the federal and state DBE Program requirements in submitting the bid, and will comply fully with these requirements in performing any federal-aid contract awarded on the basis of that bid.

(c) The bidder agrees to ensure that certified DBE firms have a full and fair opportunity to participate in the performance of the contract financed in whole or in part with federal funds. The bidder certifies that all necessary and reasonable steps were taken to ensure that DBE firms have an opportunity to compete for, and perform work on the contract. The bidder further certifies that the bidder not discriminate on the basis of race, color, age, national origin or sex in the performance of the contract, or in the award of any subcontract.

(d) The bidder certifies, under penalty of perjury and other applicable penal laws that if awarded the federal-aid contract, the contractor will make a good faith effort to utilize certified DBE firms to perform DBE work at or above the amount or percentage of the dollar value specified in the bidding documents. The bidder further certifies the bidder's understanding that the bidder may not unilaterally terminate, substitute for, or replace any DBE firm that was designated in the executed contract, in whole or in any part, with another DBE, any non-DBE firm or with the contractor's own forces or those of an affiliate of the contractor, without the prior written consent of MoDOT as set out below.

(e) The bidder certifies, under penalty of perjury and other applicable penal laws that a good faith effort was made to obtain DBE participation in the contract, at or above the DBE participation contract goal. The bidder further certifies, under penalty of perjury and other applicable penal laws, that if the bidder is not able to meet the Commission's DBE contract goal, and if the bidder is not able to meet that DBE contract goal by the time the proposed DBE participation information must be submitted, within three business days after bid opening, the bidder has submitted with and as a part of the bid, a true, accurate, complete and detailed written explanation of good faith efforts to meet the DBE Contract Goal.

(f) The bidder understands and agrees that if awarded the contract the contractor is legally responsible to ensure that the contractor and each DBE subcontractor and supplier, comply fully with all regulatory and contractual requirements of the USDOT DBE Program, and that each DBE firm participating in the contract fully perform the designated tasks, with the DBE's own forces and equipment, under the DBE's own direct supervision and management. The bidder certifies, under penalty of perjury and other applicable penal laws, that if it awarded the contract and if MoDOT or the Commission determine that the contractor, a DBE or any other firm retained by the contractor has failed to comply with the DBE Program requirements or federal or state DBE Program regulations, the Commission, through MoDOT, shall have the sole authority and discretion to determine the extent of the monetary value to which the DBE contract goals have not been met, and to assess against and withhold monetary damages from the contractor in the full amount of that breach. The Commission, through MoDOT, may impose any other remedies available at law or provided in the contract in the event of a contract breach. The bidder further understands and agrees that this clause authorizes the Commission, through MoDOT, to determine and fix the extent of the damages caused by a breach of any contractual or regulatory DBE Program requirement and that the damage assessment will be enforced in addition to, and not in lieu of, any other general liquidated damages clause in the contract. By submitting a bid for a federal-aid contract, and by entering into a contract, the bidder irrevocably agrees to such an assessment of liquidated damages for DBE Program purposes, and authorizes the Commission and MoDOT to make such an assessment of liquidated damages against the contractor, and to collect that assessment from any sums due the contractor under the contract, or any other contract, or by other legal process. The bidder makes this certification, agreement and authorization on behalf of itself, its subcontractors and suppliers, and the bid bond and contract bond sureties, for each federal-aid contract.

(g) The surety upon any bid or contract bond acknowledges the surety is held and firmly bound to the Commission for each and every duty of the surety's principal provided in any bid or contract regarding the DBE program.

10.0 Designation of DBE firms to perform on contract. The bidder states and certifies, under penalty of perjury or other applicable penal laws, that the DBE participation information submitted in the bid or within the stated time thereafter is true, correct and complete and that the information provided includes the names of all DBE firms that will participate in the contract, the specific line item (s) that each DBE firm will perform, and the creditable dollar amounts of the participation of each DBE. The specific line item must reference the MoDOT line number and item number contained in the proposal. The bidder further states and certifies that the bidder has committed to use each DBE firm listed for the work shown to meet the DBE contract goal and that each DBE firm listed has clearly confirmed that the DBE firm will participate in and perform the work, with the DBE's own forces. Award of the contract will be conditioned upon meeting these and other listed requirements of 49 CFR 26.53.

(a) The bidder certifies the bidder's understanding that as the contractor on a contract funded in whole or in part by USDOT federal funds, the bidder may not unilaterally terminate, substitute for, or replace any DBE firm that was designated in the executed contract, in whole or in any part, with another DBE, any non-DBE firm or with the contractor's own forces or those of an affiliate, without the prior written consent of MoDOT. The bidder understands it must receive approval in writing from MoDOT for the termination of a DBE firm, or the substitution or replacement of a DBE before any substitute or replacement firm may begin work on the project in lieu of the DBE firm participation information listed in the executed contract.

(1) The bidder further certifies understanding, that if a DBE firm listed in the bid or approved in the executed contract documents ceases to be certified at any time during the performance of the contract work, and a contract or subcontract with that firm has not yet been executed by the prime and subcontractor, the contractor can not count any work performed by that firm after the date of the firm's loss of eligibility toward meeting the DBE contract goal. However, if the contractor has executed a subcontract with the firm before the DBE lost eligibility and ceased to be a certified DBE, the contractor may continue to receive credit toward the DBE contract goal for that firm's work.

(2) The bidder further certifies understanding, that if a DBE subcontractor is terminated, or fails, refuses or is unable to complete the work on the contract for any reason, the contractor must promptly request authority to substitute or replace that firm. The request shall include written documentation that the DBE firm is unwilling or unable to perform the specified contract work. The contractor shall make good faith efforts to find another DBE subcontractor to substitute or replace the dollar amount of the work that was to have been performed by the DBE firm. The good faith efforts shall be directed at finding another DBE to perform the same, or more, dollar amount of work that the DBE firm that was terminated was to have performed under the executed contract. The substitute or replacement DBE firm may be retained to perform the same or different contract work from that which the terminated firm was to have performed. The contractor shall obtain approval from MoDOT in writing before the replacement or termination of one firm with another before the work will count toward the project DBE goal.

(3) The bidder further certifies the bidder's understanding, that the dollar value of any work completed by a DBE firm prior to approval of the DBE's substitution or replacement, in writing, by MoDOT will not be credited toward meeting the DBE contract goal. The contractor will remain subject to appropriate administrative remedies, including but not limited to, liquidated damages for the full dollar amount that the DBE contract goal is not met. Liquidated damages will also be assessed against the contractor if the original, substitute or replacement DBE firms perform the required contract work, but are not paid in full for some or all of that work by the contractor, including back charges. No credit toward the DBE goal will be given for any amount withheld from payment to the DBE or "back charged" against monies owed to the DBE, regardless of the purpose or asserted debt.

11.0 Good Faith Effort to Secure DBE Services. The bidder shall make a good faith effort to seek DBEs in a reasonable geographic area to where the solicitation for subcontracts and material is made. If the bidder cannot meet the goals using DBEs from that geographic area, the bidder shall, as a part of the effort to meet the goal, expand the search to a wider geographic area.

11.1 Bidding Procedure. The following bidding procedure shall apply to the contract, for DBE program compliance purposes.

11.2 Contract Goal, Good Faith Efforts Specified. The bidder may submit the completed "DBE Identification Submittal" information in the bid documents at the same time as, and within the sealed bid, at the time the bid is submitted. However, if that information is not completed and submitted with the initial sealed bid, then as a matter of responsiveness and responsibility, the apparent low and second low bidder shall file the completed "DBE Identification Submittal" pages with MoDOT on or before 4:00 p.m. of the third business day after the bid opening date, directly to the External Civil Rights Administrator, Missouri Department of Transportation, 105 W. Capitol Avenue, P.O. Box 270, Jefferson City, Missouri 65102-0270. Telefax transmittal to MoDOT will be permitted at fax no. (573) 526-0558. The complete and signed original documents shall be mailed to MoDOT no later than the day of the telefax transmission. No extension of time will be allowed for any reason. The means of transmittal and the risk of timely receipt of the information shall be the bidder's.

11.3 Bid Rejection, Bid Security Disposition. The failure of either the apparent low bidder or the second low bidder to file the completed and executed "DBE Identification Submittal", listing actual, committed DBE participation equal to or greater than the DBE contract goal percentage specified in the bid by 4:00 p.m. on the third business day after the bid opening, will be cause for rejection of that bid, and the bid surety bond or bid guaranty of that bidder will be forfeited to and become the property of the Commission upon Commission demand.

(a) Any bidder rejected for failure to submit the completed and executed "DBE Identification Submittal" information in the bidding documents, with full documentation of sufficient DBE participation to satisfy the DBE contract goal cannot submit a bid on the same, or substantially similar, project, when and if the project is re-

advertised for bids. By submitting a bid on a federal-aid project, the bidder accepts and agrees to this provision, and the disposition of the bidders bid bond or guaranty, on behalf of the bidder and the bidders bid surety or guaranty.

(b) The surety separately acknowledges the surety to be held and firmly bound to the Commission to immediately upon demand pay to Commission the face amount of the bid bond.

11.4 Good Faith Efforts Described. Good faith efforts to meet the DBE contract goal may include, but are not limited to, the following:

(a) Attending a pre-bid meeting, if any, scheduled by the department to inform DBEs of contracting and subcontracting opportunities.

(b) Advertising in general circulation trade association and socially and economically disadvantaged business directed media concerning subcontracting opportunities.

(c) Providing written notice to a reasonable number of specific DBEs so that the DBE's interest in the contract are solicited in sufficient time to allow the firm to participate effectively.

(d) Following-up on initial written notice or solicitations of interest by contacting DBEs to determine with certainty whether the DBEs were interested.

(e) Maintaining documentation of responses received in the effort to solicit DBE participation.

(f) Selecting portions of work to be performed by DBEs to increase the likelihood of meeting the DBE goal, including, where appropriate, breaking down contracts into economically feasible units to facilitate DBE participation.

(g) Providing interested DBEs adequate information about plans, specifications and requirements of the contract.

(h) Negotiating in good faith with interested DBEs, not rejecting DBEs as unqualified without sound business reasons based on a thorough investigation of the DBE's capabilities.

(i) Making efforts to assist interested DBEs in obtaining bonding, lines of credit or insurance required by MoDOT or by the bidder.

(j) Making effective use of available disadvantaged business organizations, minority bidders' groups, local, state and federal disadvantaged business assistance offices, MoDOT and other organizations that provide assistance in the recruitment and placement of DBEs.

11.5 Documentation, and Administrative Reconsideration of the Bidder's Good Faith Efforts. In the bidding documents, the bidder has the opportunity and responsibility to provide certified written documentation as to whether the bidder made a good faith effort to meet the DBE contract goal as proposed by the Commission. Any bidder that has not met the Commission's proposed DBE contract goal at the time of bid opening must submit the completed "Certification of Good Faith Efforts to Obtain DBE Participation". The certification should be included in the bidding documents, fully and in detail, at the time its sealed bid is submitted; however, if that information is not completed and submitted with the initial sealed bid, the bidder must submit the documentation to MoDOT on or before 4:00 p.m. of the third business day after the bid opening date, directly to the External Civil Rights Administrator, Missouri Department of Transportation, 105 W. Capitol Avenue, P.O. Box 270, Jefferson City, Missouri 65102-0270. Telefax transmittal to MoDOT will be permitted at fax no. (573) 526-0558. The complete and signed original documents shall be mailed to MoDOT no later than the day of the telefax transmission. No extension of time will be allowed for any reason. The means of transmittal and the risk of timely receipt of the information shall be the bidder's. The bidder shall attach additional pages to the certification, if necessary, in order to fully detail specific good faith efforts made to obtain certified DBE firm participation in the proposed contract work. If the apparent low bidder appears to have failed to adequately document in the bid that the bidder made a good faith effort to achieve sufficient DBE participation in the contract work, that firm will be offered the opportunity for administrative reconsideration upon written request, before MoDOT and the Commission reject that bid as non-responsive. However, regardless of the DBE contract goal participation level proposed by the bidder, or the extent of good faith efforts shown, the apparent low and second low bidders shall each timely and separately file

their completed and executed "DBE Identification Submittal" or face potential sanctions and the bid bond or guaranty, as specified in Sec 10.0 of these provisions, may become the property of the Commission subject to Commission's demand.

12.0 DBE Participation for Contract Goal Credit. DBE participation on the contract will count toward meeting the DBE contract goal as follows:

(a) The applicable percentage of the total dollar value of the contract or subcontract awarded to the DBE will be counted toward meeting the DBE contract goal, only if that firm is certified by MoDOT as a DBE at the time the contract or subcontract is executed, and only for the value of the work, goods or services that are actually performed, or provided, by the DBE firm itself.

(b) When a DBE performs work as a participant in a joint venture, the contractor may count toward the DBE goal only that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the contract work that the DBE has performed with the DBE's own forces. The MoDOT External Civil Rights Administrator shall be contacted in advance regarding any joint venture involving both a DBE firm and a non-DBE firm to review and approve the contractor's organizational structure and proposed operation. When a DBE subcontracts part of the work of the contract to another firm, the value of that subcontracted work may be counted toward the DBE contract goal only if the DBE's subcontractor at a lower tier is a MoDOT certified DBE. Work that a DBE subcontracts to a non-DBE firm will not count toward the DBE contract goal. The cost of supplies and equipment a DBE subcontractor purchases or leases from the prime contractor or the prime's affiliated firms, or from another non-DBE subcontractor, will not count toward the DBE contract goal.

(c) The contractor may count expenditures to a DBE subrecipient toward the DBE contract goal only if the DBE performs a commercially useful function (CUF) on that contract.

(d) A contractor may not count the participation of a DBE subcontractor toward the contractor's final compliance with the contractor's DBE contract goal obligations until the amount being counted has actually been paid to the DBE. A contractor may count 60 percent of the contractor's expenditures actually paid for material and supplies obtained from a DBE certified by MoDOT as a regular dealer, and 100 percent of such expenditures actually paid for materials and supplies obtained from a certified DBE manufacturer.

(1) A regular dealer will be defined as a firm that owns, operates, or maintains a store, warehouse or other establishment in which the material, supplies, articles or equipment required and used under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a regular dealer, the DBE firm shall be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions will not be considered regular dealers.

(2) A DBE firm may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone or asphalt, without owning, operating or maintaining a place of business where it keeps such items in stock, if the DBE both owns and operates distribution equipment for the products it sells and provides for the contract work. Any supplementation of a regular dealer's own distribution equipment shall be by a long-term lease agreement, and not on an *ad hoc* or contract-by-contract basis.

(3) If a DBE regular dealer is used for DBE contract goal credit, no additional credit will be given for hauling or delivery to the project site goods or materials sold by that DBE regular dealer. Those delivery costs shall be deemed included in the price charged for the goods or materials by the regular dealer, who shall be responsible for their distribution.

(4) A manufacturer will be defined as a firm that operates or maintains a factory or establishment that produces on the premises, the material, supplies, articles or equipment required under the contract and of the general character described by the project specifications. A manufacturer will include firms that produce finished goods or products from raw or unfinished material, or that purchases and substantially alters goods and materials to make them suitable for construction use before reselling them.

(e) A contractor may count toward the DBE contract goal the following expenditures to certified DBE firms that are not "regular dealers" or "manufacturers" for DBE program purposes:

(1) The contractor may count toward the DBE contract goal the entire amount of fees or commissions charged by a certified DBE firm for providing a bona fide service, such as professional, technical, consultant or managerial services, or for providing bonds or insurance specifically required for the performance of the federal-aid contract, if the fee is reasonable and not excessive, compared with fees customarily charged for similar services.

(2) The contractor may count toward the DBE contract goal the entire amount of that portion of the construction contract that is performed by the DBE's own forces and equipment, under the DBE's supervision. This includes the cost of supplies and material ordered and paid for by the DBE for contract work, including supplies purchased or equipment leased by the DBE except supplies and equipment a DBE subcontractor purchases or leases from the prime contractor or its affiliates.

(f) A contractor may count toward the DBE contract goal 100 percent of the fees paid to a certified DBE trucker or hauler for delivery of material and supplies required on a job site, but not for the cost of those materials or supplies themselves, or for the removal or relocation of excess material from or at the job site, when the DBE certified trucking company is not also the manufacturer of or a regular dealer in those material and supplies, provided that the trucking or hauling fee is determined by MoDOT to be reasonable as compared with fees customarily charged by non-DBE firms for similar services. The certified DBE trucking firm shall also perform a CUF on the project and not operate merely as a pass through for the purposes of gaining credit toward the contract DBE goal. Prior to submitting a bid, the contractor shall determine, or contact the MoDOT External Civil Rights Administrator for assistance in determining, whether a DBE trucking firm will meet the criteria for performing a CUF on the project.

(g) The contractor will receive DBE contract goal credit for the fees or commissions charged by and paid to a DBE broker who arranges or expedites sales, leases or other project work or service arrangements, provided that those fees are determined by MoDOT to be reasonable and not excessive, as compared with fees customarily charged by non-DBE firms for similar services. A broker will be defined as a person or firm that does not own or operate the delivery equipment necessary to transport materials, supplies or equipment to or from a job site; a broker typically will not purchase or pay for the material, supplies or equipment, and if the broker does purchase or pay for those items, those costs will be reimbursed in full. In most instances, the broker is merely the entity making arrangements for delivery of material, supplies, equipment, or arranging project services. To receive DBE contract goal credit, MoDOT must determine that the DBE broker has performed a CUF in providing the contract work or service.

13.0 Performing a Commercially Useful Function (CUF). No credit toward the DBE contract goal will be allowed for contract payments or expenditures to a DBE firm, if that DBE firm does not perform a CUF on that contract. A DBE performs a CUF when the DBE is solely responsible for execution of a distinct element of the contract work, and the DBE actually performs, manages and supervises the work involved with the firm's own forces. To perform a CUF, the DBE alone shall be responsible, and alone must bear the risk, for the material and supplies used on the contract, selecting a supplier or dealer from those available, negotiating price, determining quality and quantity, ordering the material and supplies, installing those materials with the DBE's own forces and equipment and paying for those materials and supplies. The amount the DBE firm is to be paid under the contract shall be commensurate with the work the DBE actually performs and the DBE credit claimed for the DBE's performance.

13.1 Contractor's Obligation to Monitor CUF Performance. It shall be solely the contractor's responsibility to ensure that all DBE firms perform a CUF. Further, the contractor is responsible to, and shall ensure that each DBE firm fully performs the DBE's designated tasks, with the DBE's own forces and equipment, under the DBE's own direct supervision and management. MoDOT is under no obligation to warn the contractor that a DBE's participation may not count toward the goal, other than through official notification with an opportunity for administrative reconsideration at the conclusion of the contract work.

13.2 DBEs Must Perform a Useful and Necessary Role in Contract Completion. A DBE does not perform a commercially useful function if the DBE's role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation.

13.3 DBEs Must Perform The Contract Work With Their Own Workforces. If a DBE does not perform and exercise responsibility for at least 30 percent of the total cost of the DBE's contract with the DBE's own work force, or the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal

industry practice for the type of work involved, MoDOT will presume that the DBE is not performing a commercially useful function.

13.4 Factors Used to Determine if a DBE Trucking Firm is Performing a CUF. The following factors will be used to determine whether a DBE trucking company is performing a commercially useful function (CUF):

(a) To perform a CUF, the DBE trucking firm shall be completely responsible for the management and supervision of the entire trucking operation that the DBE is being paid for on the contract work. There shall not be contrived arrangement, including but not limited to, any arrangement that would not customarily exist under regular construction project subcontracting practices for the purpose of meeting the DBE contract goal.

(b) The DBE must own and operate at least one fully licensed, insured and operational truck used in performance of the contract work. This does not include a supervisor's pickup truck or a similar vehicle that is not suitable for hauling the necessary materials or supplies.

(c) The DBE receives 100 percent contract goal credit for the total reasonable amount the DBE is paid for the transportation services provided on the contract using trucks the DBE owns, insures and operates, using drivers that the DBE employs.

(d) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE firm that leases trucks from another DBE will receive credit for the total fair market value actually paid for of the transportation services the lessee DBE firm provides on the contract.

(e) The DBE may also lease trucks from a non-DBE firm, including an owner-operator. However, the DBE who leases trucks from a non-DBE is entitled to DBE contract goal credit only for the brokerage fee or commission the DBE receives as a result of the lease arrangement. The DBE will not receive credit for the total value of the transportation services provided by the non-DBE lessee. Furthermore, no DBE contract goal credit will be allowed, even for brokerage fees or commissions, where the DBE leases the trucks from the contractor on the project or a firm owned, controlled by, or affiliated by ownership or control to, the contractor.

(f) For purposes of this section, the lease shall indicate that the DBE firm leasing the truck has exclusive use of and control over the truck. This will not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, provided the lease gives the DBE absolute priority for and control over the use of the leased truck. Leased trucks shall display the name and identification number of the DBE firm that has leased the truck at all times during the life of that lease.

13.5 MoDOT Makes Final Determination On Whether a CUF Is Performed. MoDOT and the Commission will have the final authority to determine whether a DBE firm has performed a CUF on a federal-aid contract. To determine whether a DBE is performing or has performed a CUF, MoDOT will evaluate the amount of work subcontracted by that DBE firm or performed by other firms, and the other firms forces and equipment. Any DBE work performed by the contractor, or by employees or equipment of the contractor will be subject to disallowance under the DBE Program, unless the independent validity and need is demonstrated.

14.0 Verification of DBE Participation, Liquidated Damages.

14.1 Prior to final payment by the Commission, the contractor shall file with the Commission a detailed list showing each DBE used on the contract work, and the work performed by each DBE. The list shall show the actual dollar amount paid to each DBE for the creditable work on the contract, less any rebates, kickbacks, deductions, withholdings or other repayments made. The list shall be certified under penalty of perjury, or other law, to be accurate and complete. MoDOT and the Commission will use this certification and other information available to determine if the contractor and the contractor's DBEs satisfied the DBE contract goal percentage specified in the contract and the extent to which the DBEs were fully paid for that work. The contractor shall acknowledge, by the act of filing the detailed list, that the information is supplied to obtain payment regarding a federal participation contract.

14.2 Failure on the part of the contractor to achieve the DBE participation to which the contractor committed in the contract may result in liquidated damages being imposed on the contractor by the Commission for breach of contract and for non-compliance. If the contract was awarded with less than the original DBE contract goal proposed by the Commission, the revised lower amount shall become the final DBE contract goal, and that goal will be used to

determine any liquidated damages to be assessed. Additionally, the Commission or MoDOT may impose any other administrative sanctions or remedies available at law or provided by the contract in the event of breach by the contractor by failing to satisfy the contractor's DBE contract goal commitment. However, no liquidated damages will be assessed, and no other administrative sanctions or remedies will be imposed when, for reasons beyond the control of the contractor and despite the good faith efforts made by the contractor, the final DBE contract goal participation percentage was not achieved. The contractor will be offered the opportunity for administrative reconsideration of any assessment of liquidated damages, upon written request. The administrative reconsideration officer may consider all facts presented, including the legitimacy or business reason for back charges assessed against a DBE firm, in determining the final amount of liquidated damages.

15.0 Prompt Payment Requirements. In accordance with Title 49 CFR 26.29, the contractor shall comply with the prompt payment requirements of that regulation, Section 34.057, RSMo., the provisions of the Commission's rule 7 CSR 10-8.111 and the contract. By bidding on a federal-aid contract, and by accepting and executing that contract, the contractor agrees to assume these contractual obligations, and to bind the contractor's subrecipients contractually to those prompt payment requirements at the contractor's expense.

16.0 Miscellaneous DBE Program Requirements. In accordance with Title 49 CFR Part 26 and the Commission's DBE Program rules in Title 7 CSR Division 10, Chapter 8, the contractor, for both the contractor and for the contractor's subcontractors and suppliers, whether DBE firms or not, shall commit to comply fully with the auditing, record keeping, confidentiality, cooperation and anti-intimidation or retaliation provisions contained in those federal and state DBE Program regulations. By bidding on a federal-aid contract, and by accepting and executing that contract, the contractor agrees to assume these contractual obligations, and to bind the contractor's subrecipients contractually, at the contractor's expense.

TRAINING PROVISION

1.0 Description. This provision supplements subparagraph 7(e) of the Contract Provision entitled "Standard Federal Equal Opportunity Construction Contract Specification" (Executive Order 11246)", and implements 23 USC 140(a).

2.0 Training Requirements. As part of the contractor's equal employment opportunity affirmative action program, training shall be provided as follows.

2.1 The contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade or job classification involved.

2.2 The number of trainee hours to be provided under this provision will be specified in the bidding documents.

2.3 When a contractor subcontracts a portion of the contract work, the contractor shall determine how many, if any, hours the subcontractor shall instruct the trainees. The contractor shall retain the primary responsibility for both meeting the training requirements imposed by this provision, and of informing each subcontractor about this provision.

2.4 The number of trainee hours shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Before construction, the contractor shall submit to the engineer for approval the number of trainee hours required in each selected classification and the training program to be used, or a list of the trainees participating in the Contractor Approved Training (CAT) program. The contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for the hours worked by each trainee employed on the contract work who is currently enrolled or becomes enrolled in an approved program and the contractor will be reimbursed for such trainees as provided hereinafter.

2.5 Training and upgrading of minorities and women toward journeyman status is a primary objective of this provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor shall demonstrate the steps taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this provision. This training commitment is not intended, and shall not be used, to discriminate

against any applicant for training.

2.6 No employee shall be employed as a trainee in any classification in which the employee has successfully completed a training course leading to journeyman status or in which the employee has been employed as a journeyman. The contractor shall satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records shall document the findings in each case.

2.7 The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the engineer and FHWA. Approved programs will be reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a state apprenticeship agency recognized by the Bureau of apprenticeship and training programs approved, but not necessarily sponsored by, the Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training, will also be considered acceptable provided the training is being administered consistent with the equal employment obligations of Federal-aid highway construction contracts.

2.8 Approval or acceptance of a training program shall be obtained from the engineer prior to beginning work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerical or secretarial-type positions. Training will be permissible in lower level management positions, such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted, provided significant and meaningful training is provided and approved by the engineer. Some offsite training will be permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

2.9 Except as otherwise noted below, the contractor will be reimbursed $3.50 per hour of training per contract employee in the contract in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training persons in excess of the number of trainee hours specified in the contract. Reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other sources do not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the contractor when the trainees are concurrently employed on a federal-aid project and the contractor does one or more of the following, and contributes to the cost of the training, provides instruction to the trainee, or pays the trainee's wages during the offsite training period.

2.10 No payment will be made to the contractor if either failure to provide the required training or failure to hire the trainee as a journeyman is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this provision. A trainee should begin training on the project as soon as feasible after start of work, utilizing the skill involved and should remain on the project as long as training opportunities exist in the trainee's work classification or until the trainee has completed the training program. It is not required that all trainees for the entire length of the contract. The contractor will have fulfilled the responsibilities under this provision if the contractor has provided acceptable training for the number of trainee hours specified.

2.11 Trainees shall be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the U.S. Department of Labor or Transportation in connection with the existing program will apply to all trainees being trained for the same classification who are covered by this provision.

2.12 The contractor shall furnish to the trainee a copy of the training program . The contractor shall provide each trainee and the resident engineer with a certification showing the type and length of training satisfactorily completed.

2.13 The contractor shall maintain records and furnish monthly reports documenting the contractor's performance under this provision. Monthly reports shall include at least the following information:

Contractor's name and address
Period that the report covers
Job Number, Description, and Federal Aid number
Information for each employee being trained on the project, including:
- Name
- Social Security Number
- Trade/craft
- Pay percent, based on portion of training complete (if applicable)
- Journeyman's full prevailing wage applicable
- Trainee wage
- Hours this period
- Cumulative hours for the project

Total trainee hours for the project for this period
Cumulative trainee hours for the project

STRENGTH OF CONCRETE USING THE MATURITY METHOD

1.0 Description. This specification covers the maturity method as a non-destructive means of determining in-place concrete strength for pavement or structural applications. The concept of the maturity method is based on the combined effects of concrete age and temperature, during hydration, on the rate of strength gain for a specific concrete mix. This method requires the establishment of a relationship between compressive strength and calculated maturity indices for a specific concrete mixture prior to placement of the mixture in the field. The contractor may use the maturity method in accordance with this specification to estimate the compressive strength of the in-place concrete.

2.0 Procedure. In-place concrete strength determined by the maturity method shall be in accordance with ASTM C 1074, except as noted herein.

2.1 Maturity Meter. The maturity meter shall have a secure means of collecting data that is unalterable.

2.2 Maturity Function Values. In lieu of determining values for datum temperature, T_o, or activation energy divided by the gas constant, Q, values of 14° F (-10° C) or 5000 Kelvin may be used, respectively.

2.3 Standardization. The calibration of systems used for monitoring the maturity of concrete shall be verified every seven working days in accordance with AASHTO TP 52, Section 9.1 and ASTM C 1074, Section 7.1.

2.4 Development of the Strength-Maturity Relationship. The contractor shall develop the strength-maturity relationship prior to placing any concrete on the project, and shall notify the engineer prior to development of the maturity curve. The development of the strength-maturity relationship shall be done in the field using project equipment and materials.

2.4.1 When the strength-maturity relationship is developed, compressive strength specimens shall be fabricated, cured and tested at the plant site and fabricated from a minimum 3 cubic yard (2.3 m^3) batch of concrete. Temperature of the fresh concrete shall be measured and recorded. All field specimens shall be fabricated and cured in accordance with AASHTO T 23, with the following exceptions. Specimens shall be cured for the first 24 hours under similar or like temperature conditions anticipated during construction, and specimens, including the cylinder used to monitor temperature, shall be demolded at approximately 24 hours and cured in accordance with AASHTO T 23, Section 9.1.3. The concrete mixture shall meet the specification requirements in order to determine the strength-maturity relationship. The concrete mixture shall be at or above the target air content established by the contractor.

2.4.2 The contractor shall provide the engineer with the following information prior to placing any concrete on the project:

(a) The project number, route, county, concrete job mix number and date of testing.

(b) The air, slump and water content from the batch of concrete tested.

(c) The amount and type of admixture(s) used in the concrete mix.

(d) The strength of each test specimen, and the average strength of test specimens at each test age.

(e) Maturity index for each instrumented test specimen, and the average maturity index for the instrumented specimens at each test age.

(f) A graph of the average compressive strength versus the average value of the maturity index, as described in the strength-maturity relationship section of ASTM C 1074.

2.5 Compressive Strength Testing. At a minimum, compressive strength tests shall be performed on three specimens, and the average strength computed at 1, 3, 7, 14 and 28 days. Production may start after the seven-day compressive strengths have been determined with approval from the engineer.

2.6 Placement of Temperature Sensors. For pavement and pavement repairs, temperature sensors shall be embedded at approximately mid-depth and 18 inches (450 mm) from the edge of pavement. For other applications, temperature sensors shall be embedded in locations considered critical in terms of exposure conditions and structural requirements. Temperature sensors shall be placed at the following frequency:

Structure Component	Frequency
Pavement	1 sensor per 3600 sq. yd. (3000 m^2), with a minimum of one in the last 50 feet (15 m) of pavement.
Pavement Repairs	1 sensor per 10 patches, with a minimum of one sensor in the last patch.
Structural	A minimum of one sensor at the end of the pour, with three other sensors available to be placed as directed by the engineer.

3.0 Proportioning, Mixing, Placing and Curing Field Placed Concrete. The maturity method does not account for variations in strength due to proportioning, mixing, placing and curing of concrete. Proper methods shall be followed at all times during proportioning, mixing, placing and curing the field placed concrete.

3.1 Field Placed Concrete Mix Requirements. Mix constituents of the field placed concrete shall not change, and mix proportions of the field placed concrete shall not vary more than five percent from the concrete mix used to develop the strength-maturity relationship. The water cement ratio shall not vary by more than 0.02. Temperature of the fresh concrete during production shall be at or above the temperature of the fresh concrete used to develop the strength-maturity relationship.

3.2 Requiring Immediate Validation of Strength-Maturity Relationship. If the mix constituents change more than five percent, the water cement ratio changes more than 0.02, the material sources change or the mixing operation changes, an immediate validation of the strength-maturity curve shall be done in accordance with Section 4.0.

4.0 Validation of Strength-Maturity Relationship. At a minimum, every seventh day of concrete placement a validation test shall be conducted to verify that in-place concrete strength is accurately represented by the strength-maturity relationship. The engineer shall be notified at least one business day in advance of when and where the validation test will be done.

4.1 The validation test shall be as follows.

4.1.1 The contractor shall document the air, slump, and water content from the batch of concrete tested and any deviations from the original job mix.

4.1.2 During placement of the field placed concrete, a minimum of four compressive strength cylinders shall be fabricated and cured as specified in Section 2.4.1 of this provision.

4.1.3 A temperature sensor shall be embedded to within 1/2 inch (13 mm) of the center of one cylinder for computing the maturity index from the measured temperature history as specified in Section 2.0 of this provision.

4.1.4 Once the maturity index, according to the temperature monitored cylinder, is achieved which corresponds to the maturity index desired for the first critical action such as opening pavement to traffic or removing formwork, three cylinders shall be tested for compressive strength.

4.1.5 The average compressive strength of the three cylinders shall be compared to the compressive strength as determined by the strength-maturity relationship. If the predicted strength is within 10 percent or 200 psi, whichever is less, of the actual compressive strength, then the strength-maturity relationship will be considered validated.

4.2 If the actual compressive strength is more than 10 percent or 200 psi (1380 kPa) above the compressive strength as determined by the strength-maturity relationship, then a new strength-maturity relationship may be developed.

4.3 If the actual compressive strength is more than 10 percent or 200 psi (1380 kPa), whichever is less, below the compressive strength as determined by the strength-maturity relationship, the contractor shall make cylinders to determine compressive strengths until a new strength-maturity relationship has been developed.

5.0 Field Documentation. The contractor shall provide the engineer with the following information prior to taking any field action based on the strength-maturity strengths:

(a) Project number, route, county, and date tested.

(b) A list of each concrete lot evaluated.

(c) Station numbers.

(d) Quantity of concrete.

(e) Maturity index determined for each sensor location.

(f) Estimated strength determined for each sensor location.

5.1 The contractor shall record all test results for equipment calibration and verification, and shall maintain all results in an organized format. Test results shall be available to the engineer at all times.

6.0 Basis of Payment. No additional payment will be made for compliance with this special provision.

"DRIVE SMART" SIGNS

1.0 Description. This work shall consist of installing "Drive Smart" signs. The 48 x 48-inch (1200 x 1200 mm) signs will be furnished by the Commission. The contractor shall furnish labor, equipment, posts and hardware for installation of the signs in accordance with this provision and the plans, or as directed by the engineer.

2.0 Material. All material shall be in accordance with Division 1000, Material Details.

3.0 Construction Requirements. The signs shall be post-mounted and placed approximately 500 feet (150 m) before the "ROAD WORK AHEAD" sign or the "ROAD WORK NEXT XX MILES" sign, for each direction of travel affected by the project. A project on only one pavement of a dual divided facility will require only one sign. The contractor shall maintain all signs until completion of the project. Upon completion of the project, the contractor shall disassemble the signs and retain the posts and hardware. The signs shall remain the property of the Commission and shall be delivered without damage to locations as directed by the engineer.

4.0 Basis of Payment. The accepted quantity of signs will be paid for at the contract unit price per each.

"POINT OF PRESENCE" SIGNS

1.0 Description. This work shall consist of installing a 96 X 48 inch (2400 X 1200 mm) “Point of Presence" sign. The Commission will furnish the sign. The contractor shall furnish labor, equipment, posts and hardware for installation of the sign in accordance with this provision or as directed by the engineer.

2.0 Construction Requirements. The "Point of Presence" sign shall be post mounted on three 3-pound/foot (4.5 kg/m) U-channel posts with 32-inch (815 mm) spacing between posts. The sign shall be placed as shown on the plans. A project impacting only one direction of a divided highway will require only one sign. The contractor shall maintain all signs until completion of the project. Upon completion of the project, the “Point of Presence” signs shall remain in place. The sign, posts and hardware will remain the property of the Commission.

3.0 Basis of Payment. The accepted quantity of "Point of Presence" signs will be paid for at the contract unit price per each.

ALTERNATE TEMPORARY EROSION CONTROL MEASURES

1.0 Description. This provision provides for alternate temporary erosion control measures to those specified in Sec 806 or as shown on the plans. All work shall be in accordance with Sec 806, except as herein specified.

2.0 Material and Design. The major items of the installation shall be the best standard products of the manufacturer and shall be of the manufacturer's latest approved design. The contractor shall furnish a manufacturer's certification that the units furnished are identical in material and design to those approved.

Alternative temporary erosion control measures shall be pre-approved prior to use. The following products have been pre-approved:

Ditch Check Type	*Product*	*Manufacturer*	*Slope*	*Drainage Area*
I	Dura Check Sediment Control Panel	Panel Products, Inc. 3216 S. Saratoga Springfield, MO 65804 Telephone (417) 886-9838	0-10%	3 acres (1.2 ha)
II	Triangular Silt Dike	Triangular Silt Dike Co., Inc. 608 Greenwood Midwest City, OK 73110 Telephone (800) 290-8473	0-10%	50 acres (20 ha)
II	Enviro Berm Porous Sediment Control System	Cascade Distribution, Inc. 15620-121A Avenue Edmonton, Alberta Canada T5V 1B5 Telephone (800) 565-6130	0-10%	50 acres (20 ha)

3.0 Installation. Alternate temporary erosion control methods shall be installed in accordance with the manufacturer's recommendations at the locations shown on the plans.

4.0 Maintenance. Alternate temporary erosion control methods shall be maintained as required by the manufacturer and as directed by the engineer.

ERRATA CORRECTIONS TO 2004 MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION

The following changes are issued to address typographical corrections.

Page	Section	
	105.18.1	The last sentence should read "…..effective on the date arbitration is demanded…."
	105.18.4.3 F-3.	Should read "Shall be replaced with the following:"
149	216.50.2.2	The section reference should read Sec 1081.
150	216.60.2.4	The section reference should read Sec 1081.
191	403.13	In the last sentence the metric equivalencies should be (50 mm) for SP190 and (75 mm) for SP250.
229	413.30.4.1.2	Should read 600 Mg.
229	413.30.4.1.3	Should read 600 Mg.
280	505.20.3.1	Fifth row in table should read "Latex Emulsion Admixture, gallons/sack (L/kg) min."
396	625.20.2.1	The density requirement should read, 3 pcf (48 kg/m^3).
536	901.3	Ninth row in table should read "Galvanized Coating of Steel….. 1080."
546	902.4	Thirteenth row in table should read "Fiber Optic Cable….. 1092".
546	902.4	Thirteenth row in table should read "Fiber Optic Interconnect…."

REVISIONS TO 2004 MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION

SECTION 105 – CONTROL OF WORK

Amend Sec 105 to include the following: ***07/04***

105.18 Arbitration.

105.18.1. Purpose. By adoption of 226.096 RSMo (L. 2003, HB 668), certain controversies or claims to which the Missouri Department of Transportation is a party that arises out of or relates to a contract awarded pursuant to subdivision (9) of subsection 1 of 226.130 (RSMo) subject to certain limits and preconditions are subject to, "be settled (sic) by arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules, except as provided," in 226.096. Under the provisions of Chap. 435 RSMo arbitration is the subject of agreement between the parties to a contract. This section provides for incorporation of the, American Arbitration Association's, *Construction Industry Arbitration Rules and Mediation Procedures (AAA Rules)*, amended and effective on the date arbitration is demanded and for their modification and revisions as permitted by the AAA Rules and Chap. 435 RSMo.

105.18.2. Incorporation. The AAA Rules are incorporated as part of the contract except as amended or excluded. The AAA Rules are further expressly amended or excluded as provided herein and as provided directly or indirectly by 226.096 RSMo (L. 2003, HB 668) and Chap. 435 RSMo.

105.18.3 Regular Track Procedures. The AAA Construction Industry Arbitration Rules, Regular Track Procedures, July 1, 2003 are amended as follows:

105.18.3.1 R-1. Agreement of Parties. Not revised.

105.18.3.2 R-2. AAA and Delegation of Duties. Not revised.

105.18.3.3 R-3. National Roster of Neutrals – Shall be replaced with the following:

In cooperation with the National Construction Dispute Resolution Committee the AAA shall establish and maintain a National Roster of Construction Arbitrators ("National Roster") and shall appoint arbitrators as provided first by the provisions of Missouri law, including 7 CSR 10-26, and then as provided in these rules. The term "arbitrator" in these rules refers to the arbitration panel, constituted for a particular case, whether composed of one or more arbitrators, or to an individual arbitrator, as the context requires.

105.18.3.4 R-4. Initiation under an Arbitration Provision in a Contract. Not revised.

105.18.3.5 R-5. Initiation under a Submission. Not revised.

105.18.3.6 R-6. Changes to Statement of Controversy or Claim - Shall be replaced with the following:

The contract between the parties provides for a Notice of Controversy or a Claim for adjustment to the contract prior to any demand for arbitration. Arbitration demands, issues, nature or amount of relief sought, shall not differ or be additional to that in the Notice of Controversy or Claim for contract adjustment provided for in the contract. There may not be a revision of the issues, nature of relief sought or increase in relief during or by way of any presentation of evidence during the arbitration. No award may be upon different issues or basis of relief or provide relief different in nature or greater in amount than contained in the Notice of Controversy or Claim given under the contract and stated in the demand for arbitration. No new or different controversy, claim or counterclaim may be submitted to the arbitrator except with the consent of both parties and the arbitrator and any consent must be clearly expressed, written and signed by the parties. There will be no amendments by implication.

105.18.3.7 R-7. Consolidation or Joinder - Shall be replaced with the following:

If Commission expressly agrees in writing with regard to multiple disputes arising under a particular contract, multiple demands may be consolidated so long as the relief sought in total does not exceed $328,011 in the principal relief sought, as adjusted on an annual basis effective January first of each year in accordance with the Implicit Price Deflator for Personal Consumption Expenditures as calculated pursuant to subsection 5 of section 537.610, RSMo. Demands to which Commission is not a party in direct privity of contract will never be joined. The issue of consolidation of claims and joinder of parties will not be arbitrable. Nothing in this section shall prohibit more than one demand for arbitration pursuant to the same contract, provided that each demand for arbitration arises from a separate claim based upon facts supporting a separate right of relief, filed with the Department and accepted by the department under the Missouri Department of Transportation's "Contractor Claims and Controversies Procedures". Neither shall a prime contractor be prohibited from filing a demand for arbitration arising from work, which was subcontracted provided that; (a) the claim was initially accepted by the department under "Contractor Claims and Controversies Procedures." and (b) would provide a right to contract adjustment separate from any claimed or which could be claimed by the prime contractor for it's sole benefit. However, subcontractors shall have no right to file a demand for arbitration with the Commission.

105.18.3.8 R-8. Jurisdiction. Not revised.

105.18.3.9 R-9. Mediation. Not revised.

105.18.3.10 R-10. Administrative Conference. Not revised.

105.18.3.11 R-11. Fixing of Locale. Not revised.

105.18.3.12 R-12. Appointment of Arbitrators – Delete paragraphs (a), (b), and (c) and replace with the following:

Arbitrators will be selected and appointed in accordance with 7 CSR 10-26.

105.18.3.13 R-13. Direct Appointment by a Party. Not revised.

105.18.3.14 R-14. Appointment by a Chairperson by Party-Appointed Arbitrators or Parties. Not revised.

105.18.3.15 R-15. Nationality of Arbitrator in International Arbitration. Not revised.

105.18.3.16 R-16. Number of Arbitrators. Not revised.

105.18.3.17 R-17. Disclosure. Not revised.

105.18.3.18 R-18. Disqualification of Arbitrator. Not revised.

105.18.3.19 R-19. Communication with Arbitrator. Not revised.

105.18.3.20 R-20. Vacancies. Not revised.

105.18.3.21 R-21. Preliminary Hearing. Not revised.

105.18.3.22 R-22. Exchange of Information. Not revised.

105.18.3.23 R-23. Date, Time, and Place of Hearing. Not revised.

105.18.3.24 R-24. Attendance at Hearings. Not revised.

105.18.3.25 R-25. Representation. Not revised.

105.18.3.26 R-26. Oaths. Not revised.

105.18.3.27 R-27. Stenographic Record. Not revised.

105.18.3.28 R-28. Interpreters. Not revised.

105.18.3.29 R-29. Postponements. Not revised.

105.18.3.30 R-30. Arbitration in the Absence of a Party or Representative. Not revised.

105.18.3.31 R-31. Conduct of Proceedings. Not revised.

105.18.3.32 R-32. Evidence. Not revised.

105.18.3.33 R-33. Evidence by Affidavit and Posthearing Filing of Documents or Other Evidence. Not revised.

105.18.3.34 R-34. Inspection or Investigation. Not revised.

105.18.3.35 R-35. Interim Measures. Not revised.

105.18.3.36 R-36. Closing of Hearing. Not revised.

105.18.3.37 R-37. Reopening of Hearing. Not revised.

105.18.3.38 R-38. Waiver of Rules. Not revised.

105.18.3.39 R-39. Extensions of Time. Not revised.

105.18.3.40 R-40. Serving of Notice – Paragraphs (a) and (b) shall be replaced with the following:

(a) Any papers, notices, or process necessary or proper for the initiation or continuation of an arbitration under these rules; for any court action in connection therewith, or for the entry of judgment on any award made under these rules, may be served on a party by mail addressed to the party or its representative at the last known address with return receipt or by personal service, in or outside the state where the arbitration is to be held, provided that reasonable opportunity to be heard with regard thereto has been granted to the party.

(b) The AAA, the arbitrator and the parties may also use overnight delivery with return receipt or electronic facsimile transmission (fax) to give the notices required by these rules. Facsimile transmission must require an acknowledgment that an entire legible transmission was received. Where all parties and the arbitrator agree, notices may be transmitted by electronic mail (email), or other methods of communication.

(c) Not revised

105.18.3.41 R-41. Majority Decision. Not revised.

105.18.3.42 R-42. Time of Award. Not revised.

105.18.3.43 R-43. Form of Award – Paragraph (b) shall be replaced with the following:

(a) Not revised.

(b) The arbitrator shall provide a concise, written breakdown of the basis of the award and a written explanation and justification for the awarded amount.

105.18.3.44 R-44. Scope of Award. Not revised.

105.18.3.45 R-45. Award upon Settlement. Not revised.

R105.18.3.46 R-46. Delivery of Award to Parties. Not revised.

105.18.3.47 R-47. Modification of Award. Not revised.

105.18.3.48 R-48. Release of Documents for Judicial Proceedings. Not revised.

105.18.3.49 R-49. Applications to Court and Exclusion of Liability – Paragraph (c) shall be replaced with the following:

(a) Not revised.

(b) Not revised.

(c) Parties to these rules shall be deemed to have consented that judgment upon the arbitration award shall be entered as provided by 226.096, RSMo (L. 2003, HB 668).

(d) Not revised.

105.18.3.50 R-50. Administrative Fees. Not revised.

105.18.3.51 R-51. Expenses. Not revised.

105.18.3.52 R-52. Neutral Arbitrator's Compensation. Not revised.

105.18.3.53 R-53. Deposits. Not revised.

105.18.3.54 R-54. Interpretation and Application of Rules. Not revised.

105.18.3.55 R-55. Suspension for Nonpayment. Not revised.

105.18.4 Fast Track Procedures. The AAA Construction Industry Arbitration Rules, Fast Track Procedures, July 1, 2003 are amended as follows:

105.18.4.1 F-1. Limitation on Extensions. Not revised.

105.18.4.2 F-2. Changes of Claim or Counterclaim - Shall be replaced with the following:

The contract between the parties provides for a Notice of Controversy or a Claim for adjustment to the contract prior to any demand for arbitration. Arbitration demands, issues, nature or amount of relief sought, shall not differ or be additional to that in the Notice of Controversy or Claim for contract adjustment provided for in the contract. There may not be a revision of the issues, nature of relief sought or increase in relief during or by way of any presentation of evidence during the arbitration. No award may be upon different issues or basis of relief or provide relief different in nature or greater in amount than contained in the Notice of Controversy or Claim given under the contract and stated in the demand for arbitration. No new or different controversy, claim or counterclaim may be submitted to the arbitrator except with the consent of both parties and the arbitrator and any consent must be clearly expressed, written and signed by the parties. There will be no amendments by implication.

105.18.4.3 F-3. Serving of Notice – Shall be replaced with the following:

(a) Any papers, notices, or process necessary or proper for the initiation or continuation of an arbitration under these rules; for any court action in connection therewith, or for the entry of judgment on any award made under these rules, may be served on a party by mail addressed to the party or its representative at the last known address with return receipt or by personal service, in or outside the state where the arbitration is to be held, provided that reasonable opportunity to be heard with regard thereto has been granted to the party.

(b) The AAA, the arbitrator and the parties may also use overnight delivery with return receipt or electronic facsimile transmission (fax) to give the notices required by these rules. Facsimile transmission must require an acknowledgment that an entire legible transmission was received. Where all parties and the arbitrator agree, notices may be transmitted by electronic mail (email), or other methods of communication.

105.18.4.4 F-4. Appointment and Qualification of Arbitrator - Shall be replaced with the following:

The provisions of 7 CSR 10-26 and the procedures for regular track arbitrator selection, apply to fast track procedure arbitrations.

105.18.4.5 F-5. Preliminary Telephone Conference. Not revised.

105.18.4.6 F-6. Exchange of Exhibits. Not revised.

105.18.4.7 F-7. Discovery. Not revised.

105.18.4.8 F-8. Proceedings on Documents. Not revised.

105.18.4.9 F-9. Date, Time, and Place of Hearing. Not revised.

105.18.4.10 F-10. The Hearing. Not revised.

105.18.4.11 F-11. Time of Award. Not revised.

105.18.4.12 F-12. Time Standards. Not revised.

105.18.4.13 F-13. Arbitrator's Compensation. Not revised.

105.18.5 Form of Award – Shall be added as follows:

The arbitrator shall provide a concise, written breakdown of the basis of the award and a written explanation and justification for the awarded amount.

SECTION 106 – CONTROL OF MATERIAL

Amend Sec 106 to include the following: ***04/05***

106.14 Proprietary Items. In the event a proprietary item included in a contract becomes unavailable during the term of the contract, the contractor shall promptly provide documentation to the engineer substantiating that the proprietary item is unavailable. Price or credit terms demanded of the contractor by the supplier will not constitute sufficient reason to substitute for the specified proprietary item. As part of the documentation, the contractor shall propose an alternative source or item that meets the performance requirements of the original proprietary item included in the contract. Any adjustment in the contract unit price shall be made in accordance with Sec 109.4. If an acceptable alternative item cannot be located, the proprietary item and any associated work may be underrun from the contract.

SECTION 109 – MEASUREMENT AND PAYMENT

Delete Sec 109.7.2 and substitute the following: ***11/05***

109.7.2 Material Allowance. The engineer may, in any payment estimate, include the value of any non-perishable material that will be finally incorporated in the completed work. The material shall be in conformity with the plans

and specifications in the contract, and shall not have been used at the time of such estimate. The value of such material in a single submission from one supplier shall be no less than $10,000.00. The material shall be delivered to the project or other location that is approved by the engineer. Any storage area not within the right of way shall be leased at the contractor's expense with provisions for right of entry by the engineer during the period of storage. Invoices for material payment shall be submitted to the engineer at least four days prior to the estimate date. Receipted invoices for all material payments previously allowed on the estimate shall be submitted to the engineer within 42 days of the date of the estimate on which material allowance was made or such material allowance will be deducted from future payments. The amounts paid for such material shall reduce the amount of other partial or final payments due the contractor for the work performed as the materials are fabricated or incorporated in the completed work.

SECTION 202 – REMOVAL OF ROADWAYS AND BUILDINGS

Amend Section 202 to include the following: ***11/05***

202.40.1.1 Notification of Demolition. The contractor shall provide proper notification to all appropriate federal, state and local agencies prior to demolition. Notification is necessary for the demolition of a building regardless of whether asbestos is present. The notification procedures and forms are available from MDNR. The contractor shall provide copies of all completed and approved forms to the engineer prior to any demolition work.

SECTION 206 – EXCAVATION FOR STRUCTURES

Delete Section 206.5.2 – 206.5.2.1 and substitute the following: ***11/05***

206.5.2 Final measurement of Class 3 Excavation for sewers, utilities, pipe culverts, drop inlets or manholes will not be made unless there is an authorized change from plan location resulting in a different quantity or there is an authorized change averaging more than 6 inches (150 mm) in the foundation elevation. If a revision is made or an appreciable error is found in the contract quantity, the revision or correction will be computed and added to or deducted from the contract quantity. Measurement of Class 3 Excavation will be made to the nearest cubic yard (m^3) for each structure of that volume of material actually removed from within the area bounded by vertical planes 18 inches (450 mm) outside of the outer walls of the structure. The upper limits of the volume measured, will be the existing ground line, or the lower limits of the roadway excavation, whichever is lower. The lower limits of the volume measured will include excavation necessary for pipe bedding.

Delete Section 206.5.3 and substitute the following: ***11/05***

206.5.3 Measurement of Class 4 Excavation for box culverts classified as bridges will be made to the nearest cubic yard (m^3) for each structure of that volume of material actually removed from within the area bounded by vertical planes 18 inches (450 mm) outside of the outer walls of box culverts with bottom slabs. The upper limits of the volume measured will be the existing ground line, or the lower limits of the roadway excavation, whichever is lower. Class 4 Excavation under embankments and in channel changes will be measured from the original ground surface unless otherwise designated on the plans. For box culverts without bottom slabs, measurement will be made as above except no material below plan flow line will be included that is outside of the area bounded by vertical planes 18 inches (450 mm) each side of and parallel with the neat lines of the walls or footings. Final measurement of Class 4 Excavation for box culverts not classified as bridges, small retaining walls and miscellaneous structures will not be made unless there is an authorized change from plan location resulting in a different quantity or there is an authorized change averaging more than 6 inches (150 mm) in the foundation elevation. If a revision is made or an appreciable error is found in the contract quantity, the revision or correction will be computed and added to or deducted from the contract quantity. Excavation classification will not change if a substitution of a drainage structure type is approved.

Delete Section 206.5.4 and substitute the following: ***11/05***

206.5.4 Where concrete in footings or walls is cast against the vertical faces of the excavation, the neat lines of the concrete footings will be considered the limits of excavation for that depth in which the concrete is in contact with the excavation, and no measurement will be made of any excavation or overbreak beyond the neat footing lines.

Amend Section 206.5 to include the following: ***11/05***

206.5.5 Final measurement of the porous backfill will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. Where required, the volume of porous backfill will be computed to the nearest cubic yard (m^3) at each structure from dimensions on the plans. Any porous backfill material placed outside the neat lines shown on the plans shall be placed at the contractor's expense. The revision or correction will be computed and added to or deducted from the contract quantity.

SECTION 216 – REMOVALS FOR BRIDGE STRUCTURES

Delete Sec 216.10.2 and substitute the following: ***11/05***

216.10.2 Removal Requirements. The entire structure, including all substructure units, shall be removed to an elevation 2 feet (600 mm) below the finished ground line or streambed. Any portion of an existing structure below the ground line that interferes with the construction of the new structure shall be removed. Existing structures used for handling temporary traffic shall not be removed until the replacement structure is open to traffic. Notification of demolition shall be made in accordance with Sec 202.40.1.1.

SECTION 401 – PLANT MIX BITUMINOUS BASE AND PAVEMENT

Delete Sec 401.2.1 and substitute the following: ***11/05; 12/05***

401.2.1 The grade of asphalt binder will be specified in the contract. When the plasticity index on individual aggregate fractions with 10 percent or more passing the No. 30 (600 µm) sieve exceeds 3, a moisture susceptibility test shall be required in accordance with Sec 401.4.5 during the mix design process. If the plasticity index exceeds that of the material approved for the mix design, additional testing may be required. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Coarse Aggregate	1004.2
Fine Aggregate	1002.3
Mineral Filler	1002.4
Hydrated Lime	1002.5
Asphalt Binder, Performance Graded (PG)	1015

Delete Sec 401.2.2 and substitute the following: ***11/05***

401.2.2 Recycled Asphalt Pavement. Recycled Asphalt Pavement (RAP) may be used in any mixture. A maximum of 20 percent RAP may be substituted in lieu of mineral aggregate. All RAP material, except as noted below, shall be tested in accordance with AASHTO TP 58, *Method for Resistance of Coarse Aggregate Degradation by Abrasion in the Micro-Deval Apparatus*. Aggregate shall have the asphalt coating removed by either extraction or binder ignition. The material shall be tested in the Micro-Deval apparatus at a frequency of once per 1500 tons (Mg). The percent loss shall not exceed the Micro-Deval loss of the combined virgin material by more than five percent. Micro-Deval testing will be waived for RAP material obtained from MoDOT roadways. All RAP material shall be in accordance with Sec 1002 for deleterious and other foreign material.

Delete Sec 401.3 – 401.3.2 and substitute the following: ***11/05***

401.3 Composition of Mixtures. Aggregate sources shall be from the specific ledge or combination of ledges within a quarry, or processed aggregate from a particular product, as submitted in the mix design. The total aggregate prior to mixing with asphalt binder shall be in accordance with the following gradation requirements:

Sieve Size	Percent Passing by Weight (Mass)		
	Base	**BP-1**	**BP-2**
1 inch (25.0 mm)	100	100	100
3/4 inch (19.0 mm)	85-100	100	100
1/2 inch (12.5 mm)	60-90	85-100	95-100
No. 4 (4.75 mm)	35-65	50-70	60-90
No. 8 (2.36 mm)	25-50	30-55	40-70
No. 30 (600 µm)	10-35	10-30	15-35
No. 200 (75 µm)	5-12	4-12	4-12

Delete Sec 401.4.2 (b) and (c) in their entirety and insert the following: ***04/06***

(b) Source, type (formation, etc.), ledge number(s) if applicable, gradation, and deleterious content of the aggregate.

(c) Plasticity index of each aggregate fraction.

Delete Sec 401.5 in its entirety and insert the following: ***04/06***

401.5 Gradation and Deleterious Content Control. In producing mixtures for the project, the plant shall be operated such that no intentional deviations from the job-mix formula are made. The contractor shall determine on a daily basis at minimum, the gradation on the aggregate reclaimed from the RAP by either extraction or binder ignition. The gradation results shall be used to determine the daily specification compliance for the combined gradation. Mixtures as produced shall be subject to the following tolerances and controls:

(a) The total aggregate gradation shall be within the master range specified in Sec 401.3.

(b) The maximum variations from the approved job-mix formula shall be within the following tolerances:

Passing No. 8 (2.36 mm) sieve	± 5.0 percentage points
Passing No. 200 (75 µm) sieve	± 2.0 percentage points

(c) The deleterious content of the material retained on the No. 4 (4.75 mm) sieve shall not exceed the limits specified in Sec 1004.2.

(d) If the plasticity index of any fraction exceeds that of the material approved for the mix design, additional testing may be required.

(e) The quantity of asphalt binder introduced into the mixer shall be the quantity specified in the job-mix formula. No changes shall be made to the quantity of asphalt binder without written approval from the engineer. The quantity of asphalt binder determined by tests on the final mixture shall not vary by more than ± 0.5 percent from the job-mix formula.

Delete Sec 401.5.1 in its entirety and insert the following: ***04/06***

401.5.1 Sample Location. The gradations of the total aggregate will be determined from samples taken from the hot bins on batch-type plants or continuous mixing plants or from the composite cold feed belt on drum mix plants. The deleterious content of the total aggregate shall be determined from samples taken from the composite cold feed belt. When required, samples for plasticity index shall be taken from the stock pile. The RAP shall be sampled from the RAP feeding system on the asphalt plant. Samples for asphalt content determination may be taken at the plant.

Delete Sec 401.8.1 in its entirety and insert the following: ***04/06***

401.8.1 Mixture Testing. The contractor shall test the mixture at least once every 1000 tons (1000 Mg) of production or a minimum of once per day for the gradation, deleterious content, and the asphalt content. If RAP is used and AASHTO T 308 is used to determine the asphalt content, the binder ignition oven shall be calibrated in accordance with MoDOT Test Method TM 77. At the engineer's discretion, testing may be waived when production does not exceed 200 tons (200 Mg) per day. The contractor shall certify the proper proportions of a previously proven mixture were used.

Delete Sec 401.8.2 in its entirety and the following: ***04/06***

401.8.2 Failing Test. If a gradation, deleterious content, or asphalt content test result falls outside of the specification tolerances, a review or adjustment of the plant settings and production shall be made and another sample shall be immediately taken. If the second test falls outside of the specification tolerances, production shall be immediately ceased until the mixture can be brought back into specification. Cold feed bins may be adjusted 5.0 percent. Material from different formations or ledges within the formation may be adjusted no more than 2.0 percent from the approved job mix formula. Mixtures requiring more than 5.0 percent adjustment will require a new mix design.

Delete Sec 401.8.3 in its entirety and the following: ***04/06***

401.8.3 Retained Samples. One half of the contractor's sample for gradation, deleterious content, plasticity index, and asphalt content and all cores shall be retained for the engineer. The contractor shall retain the samples for 7 days.

Delete Sec 401.9 in its entirety and insert the following: ***04/06***

401.9 Quality Assurance. Acceptance tests will be performed by the engineer at a rate of one independent sample per day when production exceeds 500 tons (500 Mg) per day. A favorable comparison will be considered when a QA test is within the specification tolerances. At least once for every five days of production, a split of the contractor's sample will be tested. If the results of the split sample are not within five percent on all sieves above the No. 200 (75µm), two percent on the No. 200 (75µm), within the specification ranges on the deleterious content, within two percentage points on the plasticity index, and within 0.5 percent on the asphalt content from the contractor's results, another split sample will be taken jointly with the contractor and tested. If the second test results do not compare within the specification tolerances, production shall cease until the discrepancy is resolved. If the second test results compare within the above tolerances, production may continue. Results of QA testing will be furnished to the contractor within 24 hours of obtaining the sample.

SECTION 402 – PLANT MIX BITUMINOUS SURFACE LEVELING

Delete Sec 402.2 and substitute the following: ***11/05***

402.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Coarse Aggregate	1004.2
Fine Aggregate	1002.3
Mineral Filler	1002.4
Asphalt Binder, Performance Graded (PG)	1015.3

Delete Sec 402.2.2 and substitute the following: ***04/06***

402.2.2 Wet Bottom Boiler Slag. The contractor may furnish wet bottom boiler slag of approved quality in lieu of coarse aggregate specified in Sec 402.2. If wet bottom boiler slag is used, the slag shall meet the requirements for coarse aggregate, except that the percentage of wear specified in Sec 1004.2.1 will not apply.

Delete Sec 402.2.3 and substitute the following: ***11/05***

402.2.3 Recycled Asphalt Pavement. Recycled Asphalt Pavement (RAP) may be used in any mixture. A maximum of 20 percent RAP may be substituted in lieu of mineral aggregate. All RAP material, except as noted below, shall be tested in accordance with AASHTO TP 58, *Method for Resistance of Coarse Aggregate Degradation by Abrasion in the Micro-Deval Apparatus*. Aggregate shall have the asphalt coating removed by either extraction or binder ignition. The material shall be tested in the Micro-Deval apparatus at a frequency of once per 1500 tons (Mg). The percent loss shall not exceed the Micro-Deval loss of the combined virgin material by more than fiver percent. Micro-Deval testing will be waived for RAP material obtained from MoDOT roadways. All RAP material shall be in accordance with Sec 1002 for deleterious and other foreign material.

Delete Sec 402.3.3 ***11/05***

Delete Sec 402.5 and substitute the following: ***04/06***

402.5 Gradation and Deleterious Content Control. In producing mixture for the project, the plant shall be operated such that no deviations from the job mix formula are made. The contractor shall determine on a daily basis, at a minimum, the gradation on the aggregate reclaimed from the RAP by either extraction or binder ignition. The gradation results shall be used to determine the daily specification compliance for the combined gradation. Mixture as produced will be subject to the following tolerances and control:

(a) The total aggregate gradations shall be within the master range specified in Sec 402.3.

(b) Material passing the No. 200 (75 µm) sieve shall not vary from the job mix formula by more than ± 2.0 percentage points.

(c) The deleterious content of the material retained on the No. 4 (4.75 mm) sieve shall not exceed the limits specified in Sec 1004.2.

(d) If the plasticity index of any fraction exceeds that of the material approved for the mix design, additional testing may be required.

(e) The quantity of asphalt binder introduced into the mixer shall be that quantity specified in the job mix formula. No changes may be made to the quantity of asphalt binder specified in the job mix formula without written approval from the engineer. The quantity of asphalt binder determined by calculation or tests on the final mixture shall not vary more than ± 0.5 percent from the job-mix formula.

Delete Sec 402.6 and substitute the following: ***04/06***

402.6 Sample Location. The gradations of the total aggregate will be determined from samples taken from the hot bins on the batch-type plants, or from hot bins or combined hot aggregate flow on continuous mixing plants, or from the combined cold feed on dryer-drum plants. The deleterious content of the total aggregate will be determined from the samples taken from the combined cold feed belt. Samples for plasticity index will be taken from the stockpile. The RAP shall be sampled from the RAP feeding system on the asphalt plant.

SECTION 403 – ASPHALTIC CONCRETE PAVEMENT

Delete Sec 403.1.1 and substitute the following: ***12/05***

403.1.1 Naming Convention. The nomenclature of Superpave bituminous mixture names, such as SP125CLP, will be as follows. When only the aggregate size is shown, such as SP125, the specifications shall apply to all variations of that size, such as SP125B, SP125C, SP125CLP, etc. When "x" is indicated, such as SP125xLP, specifications shall apply to all variations of mixture designs. Stone Matrix Asphalt will be generally referred to as SMA.

Superpave Nomenclature	
SP	**Superpave**
095	9.5 mm (3/8 inch) nominal aggregate size
125	12.5 mm (1/2 inch) nominal aggregate size
190	19.0 mm (3/4 inch) nominal aggregate size
250	25.0 mm (1 inch) nominal aggregate size
x	Mixture design: B, C, E or F (as described below)
LP	Limestone porphyry (when designated)
SM	Stone Matrix Asphalt (when designated)

Delete Sec 403.2.5 and substitute the following: ***12/05***

403.2.5 Stone Matrix Asphalt. In addition to other requirements, material for SMA mixtures shall meet the following. Coarse aggregate shall consist of crushed limestone and either porphyry or steel slag in accordance with the quality requirements of Sec 1002, except as follows. The Los Angeles (LA) abrasion, when tested in accordance with AASHTO TM 96, shall not exceed 40 percent based on initial ledge approval and source approval. The percent absorption, when tested in accordance with AASHTO TM 85, shall not exceed 3.5 percent based on the individual fractions. The amount of flat and elongated particles, measured on material retained on a No. 4 sieve (4.75 mm), of the blended aggregate shall not exceed 20 percent based on a 3:1 ratio or 5 percent based on a 5:1 ratio.

Delete Sec 403.2.5.1 and substitute the following: ***04/05***

403.2.5.1 Filler Restriction. Rigden void content determined in accordance with MoDOT Test Method TM-73 shall be no greater than 50 percent.

Amend Sec 403.2 to include the following: ***11/05;12/05***

403.2.6 Recycled Asphalt Pavement. Recycled Asphalt Pavement (RAP) may be used in any mixture, except SMA mixtures. A maximum of 10 percent may be used in surface mixtures and a maximum of 20 percent may be used in subsurface mixtures. All RAP material, except as noted below, shall be tested in accordance with AASHTO TP 58, *Method of Resistance of Coarse Aggregate Degradation by Abrasion in the Micro-Deval Apparatus.* Aggregate shall have the asphalt coating removed either by extraction or binder ignition. The material shall be tested in the Micro-Deval apparatus at a frequency of once per 1500 tons (Mg). The percent loss shall not exceed the Micro-Deval loss of the combined virgin material by more than five percent. Micro-Deval testing will be waived for RAP material obtained from MoDOT roadways. All RAP material shall be in accordance with Sec 1002 for deleterious and other foreign material.

Delete Sec 403.3.1 and substitute the following: ***12/05***

403.3.1 Gradation. Prior to mixing with asphalt binder, the combined aggregate gradation, including filler if needed, shall meet the following gradation for the type of mixture specified in the contract. A job mix formula may be approved which permits the combined aggregate gradation during mixture production to be outside the limits of the master range when the full tolerances specified in Sec 403.5 are applied.

Percent Passing by Weight					
Sieve Size	**SP250**	**SP190**	**SP125**	**SP125xSM**	**SP095xSM**
1 1/2 in. (37.55 mm)	100	---	---	---	---
1 in. (25.0 mm)	90 - 100	100	---	---	---
3/4 in. (19.00 mm)	90 max.	90 - 100	100	100	---
1/2 in. (12.5 mm)	---	90 max.	90 - 100	90-100	100
3/8 in. (9.5 mm)	---	---	90 max.	50-80	70-95
No. 4 (4.75 mm)	---	---	---	20 - 35	30-50
No. 8 (2.36 mm)	19 - 45	23 - 49	28 - 58	16 - 24	20-30
No. 16 (1.18 mm)	---	---	---	---	21 max.
No. 30 (600 µm)	---	---	---	---	18 max.
No. 50 (300 µm)	---	---	---	---	15 max.
No. 100 (150 µm)	---	---	---	---	---
No. 200 (75 µm)	1 - 7	2 - 8	2 - 10	8.0-11.0	8.0-12.0

Delete Sec 403.3.3 and substitute the following: ***12/05***

403.3.3 Porphyry Mixtures. For SP125xLP and SMA mixtures, at least 50 percent by volume of the plus No. 8 (2.36 mm) material shall be from crushed porphyry in accordance with Sec 1002. Depending on the actual gradation of porphyry aggregate furnished, the amount of crushed porphyry required may vary, however at least 40 percent by weight (mass) of crushed porphyry will be required. Steel slag may be substituted for porphyry in SP125xLP and SMA mixtures, except at least 45 percent by weight (mass) of crushed porphyry and/or slag will be required. The engineer may approve the use of other hard, durable aggregate in addition to porphyry and steel slag.

Delete Sec 403.3.4 and substitute the following: ***12/05***

403.3.4 Minimum Stone Matrix Asphalt Binder. The percent asphalt binder for SMA mixtures shall not be less than 6.0 percent unless otherwise allowed by the engineer.

Delete Sec 403.4.2 (b) and substitute the following: ***04/06***

(b) Source, type (formation, etc.), ledge number if applicable, gradation, and deleterious content of each aggregate fraction

Delete Sec 403.4.2 (u) and substitute the following: ***12/05***

(u) Voids in coarse aggregate (VCA) for both the mixture and dry-rodded condition for SMA mixtures.

Delete Sec 403.4.2 (v) and substitute the following: ***12/05***

(v) Draindown for SMA mixtures.

Delete Sec 403.4.5 and substitute the following ***12/05***

403.4.5 Design Gyrations. The number (N) of gyrations required for gyratory compaction shall be as follows:

Design	$N_{initial}$	[a]N_{design}	[a]$N_{maximum}$
E	7	75	115
C	8	100	160
B	9	125	205

[a]SMA mixtures shall have N_{design} equal to 100 and no $N_{maximum}$ requirement.

In addition, the compaction level, as a percent of theoretical maximum specific gravity, shall be less than or equal to 91.5 percent for Design F, 90.5 percent for Design E and 89.0 percent for Designs C and B at $N_{initial}$, equal to 96.0 percent at N_{design} and less than or equal to 98.0 percent at $N_{maximum}$.

Delete Sec 403.4.6.2 and substitute the following: ***12/05***

403.4.6.2 Voids in the Mineral Aggregate (VMA).

Mixture	VMA Minimum (percent)
SP250	12.0
SP190	13.0
SP125 (except for below)	14.0
SMA	17.0

Delete Sec 403.4.6.3 and substitute the following: ***12/05***

403.4.6.3 Voids Filled With Asphalt (VFA).

Design	VFA (percent)[a]
E	65 – 78
C	65 – 75
B	65 – 75

[a]SMA mixtures shall have a minimum VFA of 75 percent.

Delete Sec 403.4.7 – 403.4.10 and substitute the following: ***12/05***

403.4.7 Dust to Binder Ratio. For all mixtures except SMA, the ratio of minus No. 200 (75 μm) material to effective asphalt binder (P_{be}) shall be between 0.8 and 1.6.

403.4.8 Moisture Susceptibility. For all mixtures except SMA, the mixture shall have a tensile strength ratio (TSR) greater than 80 percent when compacted to 95 mm (3.7 inches) with 7 ± 0.5 percent air voids and tested in accordance with AASHTO T 283. SMA mixtures shall have a TSR greater than 80 percent when compacted to 95 mm (3.7 inches) with 6 ± 0.5 percent air voids and tested in accordance with AASHTO T 283.

403.4.9 Draindown. AASHTO T 305, Draindown Test, shall be performed on all SMA mixtures prior to job mix approval. The mixture shall be stabilized in such a way that the draindown of the asphalt binder shall not exceed 0.3 percent by weight (mass) of mixture.

403.4.10 Voids in Coarse Aggregate. The percent VCA_{MIX} of SP125xSM mixtures shall be less than or equal to the VCA_{DRC} as determined using AASHTO T 19. This may be calculated using the following equations:

$$VCA_{DRC} = 100 \times (G_{CA}\gamma_w - \gamma_s) / G_{CA}\gamma_w$$

$$VCA_{MIX} = 100 - (P_{bp} \times G_{mb} / G_{CA})$$

$$P_{bp} = P_s \times PA_{bp}$$

Where:

G_{CA}	=	bulk specific gravity of the combined coarse aggregate (AASHTO T 85),
γ_s	=	unit weight (mass) of coarse aggregate in the dry-rodded condition (DRC) (lb/ft^3) (kg/m^3) (AASHTO T 19),
γ_w	=	unit weight (mass) of water (62.34 lb/ft^3) (1000 kg/m^3),
P_{bp}	=	percent aggregate by total mixture weight (mass) retained on No. 4 (4.75 mm) sieve and
PA_{bp}	=	percent aggregate by total aggregate weight (mass) retained on No. 4 (4.75 mm) sieve*.

*Use No. 8 (2.36 mm) sieve for SP095xSM

Delete Sec 403.5.1 and substitute the following: ***11/05; 04/06***

403.5.1 Gradation and Deleterious Content Control. The gradation of the aggregate shall be determined from samples taken from the hot bins on batch-type or continuous mixing plants or from the composite cold feed belt on drum mix plants. The deleterious content of the aggregate shall be determined from samples taken from the composite cold feed belt. The RAP shall be sampled from the RAP feeding system on the asphalt plant. The contractor shall determine on a daily basis at minimum, the gradation on the aggregate reclaimed from the RAP by either extraction or binder ignition. The results shall be used to determine the daily specification compliance for the combined gradation.

Delete Section 403.5.1.1 and substitute the following: ***12/05***

403.5.1.1 Stone Matrix Asphalt Tolerances. In producing mixtures for the project, the plant shall be operated such that no intentional deviations from the job mix formula are made. The maximum deviation from the approved job mix formula shall be as follows for SMA mixtures:

Sieve	**Max. Tolerance (Percent Passing by Mass)**	
	SP095	SP125
3/4 in. (19.0 mm)	---	---
1/2 in. (12.5 mm)	---	±4
3/8 in. (9.5 mm)	±4	±4
No. 4 (4.75 mm)	±3	±3
No. 8 (2.36 mm)	±3	±3
No. 200 (75 µm)	±2	±2

Delete Sec 403.5.1.2 and substitute the following: ***04/06***

403.5.1.2 Mixture Tolerance. For all other SP mixtures, the percent passing the first sieve size smaller than the nominal maximum size shall not exceed 92.0 percent, a tolerance not toexceed 2.0 percent on the No. 8 sieve (2.36 mm) from the table in Sec 403.3.1, and within therange listed in Sec 403.3.1 for the No. 200 sieve (75 µm). The deleterious content of the material retained on the No. 4 (4.75 mm) sieve shall not exceed the limits specified in Sec 1002.2.

Delete Sec 403.5.2 and substitute the following: ***12/05***

403.5.2 Density. The final, in-place density of the mixture shall be 94.0 ± 2.0 percent of the theoretical maximum specific gravity for all mixtures except SMA. SMA mixtures shall have a minimum density of 94.0 percent of the theoretical maximum specific gravity. The theoretical maximum specific gravity shall be determined from a sample representing the material being tested. Tests shall be taken not later than the day following placement of the mixture. The engineer will randomly determine test locations.

Delete Sec 403.5.8 and substitute the following: ***12/05***

403.5.8 Fibers. The fiber proportioning and delivery system for SMA mixtures shall have an accuracy of 10 percent by weight (mass) of the material actually being measured in any given period of time.

Delete Sec 403.10.2 and substitute the following: ***12/05***

403.10.2 Substitutions. With approval from the engineer, the contractor may substitute a smaller nominal maximum size mixture for a larger sized mixture. Specifications governing the substitute mixture shall apply. Except for a single surface layer, the total pavement thickness shall be maintained when the substitute mixture layer is reduced as allowed in Sec 403.13 by increasing the thickness of other layers or courses. The lesser of the contract unit price for the larger mixture and the substitute mixture shall be used.

Delete Sec 403.13 and substitute the following: ***12/05***

403.13 Spreading and Finishing. The base course, primed or tacked surface, or preceding course or layer shall be cleaned of all dirt, packed soil or any other foreign material prior to spreading the asphaltic mixture. If lumps are present or a crust of mixture has formed, the entire load will be rejected. The thickness and width of each course shall conform to the typical section in the contract. The contractor may elect to construct each course in multiple layers. The minimum compacted thickness shall be 1.25 inches (30 mm) for SP095, 1.75 inches (45 mm) for SP125, 2 inches (50 mm) for SP190, and 3 inches (75 mm) for SP250.

Delete Sec 403.15 and substitute the following: ***12/05***

403.15 Compaction. After the asphaltic mixture has been spread, struck off and surface irregularities adjusted, the asphaltic mixture shall be compacted thoroughly and uniformly by rolling to obtain the required compaction while the mixture is in a workable condition. Excessive rolling, to the extent of aggregate degradation, will not be permitted. A pneumatic tire roller shall be used as the initial or intermediate roller on any course placed as a wedge or leveling course. Rollers shall not be used in the vibratory mode when the mixture temperature is below 225 F (107 C). Pneumatic tire rollers shall not be used for SMA mixtures.

Delete Sec 403.17.2.3.1 and insert the following: ***04/06***

403.17.2.3.1 Gradation and Deleterious Content Samples. For each gradation and deleterious sample taken, the contractor shall retain for the engineer, the portion of the sample not tested after reducing the original sample to testing size.

Delete the table in Sec 403.17.3.1 and insert the following: ***04/06***

Equipment - Test Method (AASHTO)	Requirement	Interval (Month)
Gyratory Compactor - T 312	Calibrate	12[a]
Gyratory Compactor - T 312	Verify	Daily
Gyratory Molds - T 312	Check Critical Dimensions	12
Thermometers – T 209, T 166, T 312	Calibrate	6
Vacuum System - T 209	Check Pressure	12
Pycnometer (Flask) - T 209	Calibrate	Daily
Binder Ignition Oven - T 308	Verify	12[b]
Nuclear Content Gauge – T 287 or MoDOT TM 54	Drift & Stability – Manuf. Recommendation	1
Mechanical Shakers - T 27	Check Sieving Thoroughness	12
Sieves	Check Physical Condition	6
Weighted Foot Assembly - T 176	Check Weight	12
Mechanical Shaker - T 176	Check Rate & Length of Throw	12
Liquid Limit Device - T 89	Check Wear & Critical Dimensions	12
Grooving Tool - T 89	Check Critical Dimensions	12
Ovens	Verify Temp. Settings	4
Balances	Verify	12[b]
Timers	Check Accuracy	6

[a]Calibrate and/or verify after each move.
[b]Verify after each move.

Delete Sec 403.18.1 and substitute the following: ***04/06***

403.18.1 Assurance Testing. The engineer will independently sample and test the mixture from the roadway at the frequency listed in Sec 403.19.3. The independent sample will be of sufficient size to retain half for possible disputes. Further testing of this sample will be under the direction of the engineer. The retained portion of the QC samples for mixture properties , gradation, and deleterious content will be tested at a frequency no less than once per week. The engineer's test results, including all raw data, will be made available to the contractor when completed and no later than the next working day.

Delete Sec 403.18.2 and substitute the following multiple sections: ***04/06***

403.18.2 Aggregate Comparison. Comparison for aggregate will be considered favorable when the contractor's QC results and the engineer's QA test results of a retained sample compare within the following limits.

403.18.2.1 Gradation.

Sieve Size	Percentage Points
3/4 inch (19 mm) and larger	5.0
1/2 inch (12.5 mm)	5.0
3/8 inch (9.5 mm)	4.0
No. 4 (4.75 mm)	4.0
No. 8 (2.36 mm)	3.0
No. 10 (2.00 mm)	3.0
No. 16 (1.18 mm)	3.0
No. 20 (850 μ m)	3.0
No. 30 (600 μ m)	3.0
No. 40 (425 μ m)	2.0
No. 50 (300 μ m)	2.0
No. 100 (150 μ m)	2.0
No. 200 (75 μ m)	1.0

403.18.2.2 Coarse Aggregate Angularity. Angular particles shall be within 5 percentage points.

403.18.2.3 Fine Aggregate Angularity. Void content shall be within 2 percentage points.

403.18.2.4 Sand Equivalent. Sand equivalency shall be within 5 percentage points.

403.18.2.5 Thin, Elongated Particles. Flat, elongated particle content shall be within one percentage point.

403.18.2.6 Deleterious. The total and individual deleterious content shall not exceed the specification limits.

Delete the table in Sec 403.19.3 and replace with the following table: ***11/05***

Tested Property	Pay Factor	Test Method	Contractor Frequency	Engineer Frequency
Mixture temperature	No	----	1/Sublot	1/day
Temperature of base and air	No	----	As needed	As needed
Mat Density (% of theoretical maximum density) by contractor	Yes	MoDOT Test Method TM-41 or AASHTO T 166	1 Sample[b]/Sublot As needed for joints & shoulders.	1 Sample/Lot
Unconfined Joint Density	No	MoDOT Test Method TM-41 or AASHTO T 166	1 Sample[b]/Sublot	1 Sample/Lot
Cold feed or hot bin gradation	No	AASHTO T 27 and AASHTO T 11	2/Lot	1/day
FAA, CAA, Clay Content and Thin, Elongated Particles from material sampled from the cold feed or hot bin	No	AASHTO T 304, ASTM D 5821, AASHTO T 176 and ASTM D 4791	1/10,000 tons with a minimum of 1/project/mix type	1/project
Asphalt content	Yes	AASHTO T 164, or MoDOT Test Method TM-54, or AASHTO T 287, or AASHTO T 308	1/Sublot	1/day
Asphalt content of RAP	No	AASHTO T 164[d]	1/Lot	1/project
VMA @ N_{des} gyrations	Yes[a]	AASHTO T 312 and PP 28	1/Sublot	1/day
V_a @ N_{des} gyrations	Yes[a]	AASHTO T 312 and PP 28	1/Sublot	1/day
VFA @ N_{des} gyrations	No[a]	AASHTO T 312 and PP 28	1/Sublot	1/day
Theo. max SG of the mixture	No	AASHTO T 209	1/Sublot	1/day
TSR of the in place mixture	No[c]	AASHTO T 283	1/10,000 Tons or fraction thereof	1/50,000 Tons or 1/project

[a]Based on the average of a minimum of two compacted specimens.
[b]Core samples shall consist of one core. Up to two additional cores, as stated in the QC Plan, may be obtained at the same offset within one foot (0.3 m) of the randomly selected location. If more than one core is obtained, all cores shall be combined into one sample.
[c]Payment will be based on the table in Sec 403.23.5.

Delete Sec 403.19.3.1.1 and substitute the following: ***11/05***

403.19.3.1.1 Binder Ignition Modification. Asphalt content determination in accordance with AASHTO T 308, Section 6.9.1 shall be modified by adding the following: If the calibration factor exceeds 1.0 percent, lower the test temperature to 427 ± 5 C (800 ± 8 F) and repeat test. Use the calibration factor obtained at 427 C (800 F) even if it exceeds 1.0 percent. If RAP is used, the binder ignition oven shall be calibrated in accordance with MoDOT Test Method TM 77. At the engineer's discretion, testing may be waived when production does not exceed 200 tons (200 Mg) per day. The contractor shall certify the proper proportions of a previously proven mixture were used.

Delete Sec 403.23.7.3 and substitute the following: ***12/05***

403.23.7.3 Removal of Material. All lots of material with a PF_T less than 50.0 shall be removed and replaced with acceptable material by the contractor. Any sublot of material with a percent of theoretical maximum density of less than 90.0 percent or greater than 98.0 percent shall be removed and replaced with acceptable material by the contractor. For SMA mixtures, any sublot of material with a percent of theoretical maximum density of less than 92.0 percent shall be removed and replaced with acceptable material by the contractor. Any sublot of material with air voids in the compacted specimens less than 2.5 percent shall be removed and replaced with acceptable material by the contractor. No additional payment will be made for such removal and replacement. The replaced material will be tested at the frequencies listed in Sec 403.19. Pay for the material will be determined in accordance with the applicable portions of Sec 403.23 based on the replacement material.

Delete Sec 403.23.7.4.1 and substitute with the following: ***12/05***

403.23.7.4.1 Small Quantities. For each separate mixture of less than 3000 tons (3000 Mg) on individual projects, including individual projects in combination contracts, the following shall apply:

(a) QLA and PWL will not be required.

(b) Mixtures shall be within the specified limits for VMA, V_a, AC and density. In addition to any adjustments in pay due to profile, the contract unit price for the mixture represented by each set of cores will be adjusted based on actual field density above or below the specified density using the following schedule:

Field Density (Percent of Laboratory Max. Theoretical Density)			**Pay Factor (Percent of Contract Unit Price)**
For all SP mixtures other than SMA:			
		92.0 to 96.0 inclusive	100
96.1 to 96.5	or	91.5 to 91.9 inclusive	90
96.6 to 97.0	or	91.0 to 91.4 inclusive	85
97.1 to 97.5	or	90.5 to 90.9 inclusive	80
97.6 to 98.0	or	90.0 to 90.4 inclusive	75
Above 98.0	or	Below 90.0	Remove and Replace
For SMA mixtures:			
		>94.0	100
		93.5 to 93.9 inclusive	90
		93.0 to 93.4 inclusive	85
		92.5 to 92.9 inclusive	80
		92.0 to 92.4 inclusive	75
		Below 92.0	Remove and Replace

SECTION 413 – SURFACE TREATMENTS

Delete Sections 413.10.2.5, 413.10.2.5.1, 413.10.2.5.2 and 413.2.5.3 and substitute the following: ***11/05***

413.10.2.5. Material Acceptance. All aggregate shall be sampled, tested and approved by the engineer prior to use. Portland cement and hydrated lime may be accepted for use based on visual examination.

Delete Section 413.10.5.2 and substitute the following: ***11/05***

413.10.5.2 Surface Preparation. The surface shall be thoroughly cleaned of all vegetation, loose material, dirt, mud, and other objectionable material and shall be pre-wetted as required immediately prior to application of the micro-surfacing. All pavement marking shall be removed, maintained, and compensated for in accordance to Sec 620.

Delete Sec 413.30.2.3 and substitute the following: ***11/05***

413.30.2.3 Asphalt Binder. The asphalt binder shall be in accordance with Sec 1015, including all subsections pertaining to PG70-22.

SECTION 501 – CONCRETE

Insert Sec 501.2.1 as follows: ***04/06***

501.2.1 Aggregate Acceptance. Aggregate for Portland cement concrete masonry will be sampled and tested by the engineer in accordance with the following table at the last possible point of incorporation into the project.

Item	Property	Min. Number of Tests
Portland Cement Concrete Masonary	Gradation of Course Aggregate – AASHTO T 27 and T11	One per 500 cubic yards per fraction per project. None if less than 100 cubic yards
	Gradation of Course Aggregate – Aashto T 27 and T11	
	Deleterious Content – MoDOT Test Method TM 71	
	Absorption of Coarse Aggregate – AASHTO T85	
	Thin or Elongated Pieces – ASTM D4791 (+3/4 in., 5:1)	One per project

Insert Sec 501.2.2 as follows: ***04/06***

501.2.2 Retained Samples. The engineer shall retain the portion of the sample not tested after reducing the original sample to testing size. Approximately twenty percent of the retained samples will be sent to the Central Laboratory for comparison purposes.

Delete Sec 501.3 – 501.3.6 and substitute the following: ***11/05; 04/06***

501.3 Mix Design. The proportions of cement, fine aggregate and coarse aggregate for concrete shall be approved by the engineer within the applicable limits of the specifications for the class of concrete specified in the contract. The contractor shall submit a mixture designed by absolute volume methods or an optimized mix design. Optimized will refer to aggregate gradations that produce lower water demands, as well as improved workability and finishing characteristics. When an optimized mix is submitted, the target and allowable gradation range of each fraction shall be included. The contractor may be required to submit representative samples of each ingredient to Construction and Materials for laboratory testing.

501.3.1 For optimized PCCP mixes, the gradation requirements of Sec 1005.2 and Sec 1005.3 will not apply. For all fractions, 100 percent of each fraction shall pass the 2-inch (50 mm) sieve. When Gradation F is required, 100 percent of each fraction shall pass the 1/2-inch (12.5 mm) sieve. For coarse and fine fractions, when combined, the total percent passing the No. 200 (75 µm) sieve, shall not exceed 2.5 percent and no more than 4.0 percent shall pass the NO. 200 (75 µm) sieve for any individual fraction used in the combined gradation.

501.3.2 For optimized PCCM mixes, the gradation requirements of Sec 1005.2 and Sec 1005.3 will not apply. For coarse aggregate, 100 percent of each fraction shall pass the one-inch (25 mm) sieve and no more that 2.5 percent shall pass the No. 200 (75 µm) sieve. For fine aggregate, no more than 2.0 percent shall pass the No. 200 (75 µm) sieve for natural sand, and no more than 4.0 percent shall pass the No. 200 (75 µm) sieve for manufactured sand.

501.3.3 When optimized aggregate gradations are not selected by the contractor, all provisions, including gradations requirements of Sec 105 shall apply

501.3.4 Fine aggregates are grouped into four classes, and a minimum cement factor has been established for each class.

501.3.5. The cement factor or the quantity of cement used in any cubic yard (m^3) of concrete shall be the cement content in sacks per cubic yard (kg/m^3) of concrete as determined from a summation of the absolute volumes of all the ingredients and, when air-entrained concrete is specified, the volume of air. The cement requirements in sacks per cubic yard (kg/m^3) of concrete for the various classes of sand shall be as follows:

Cement Requirements[a,b]						
Class of Sand	**Class A-1 Concrete**	**Class B Concrete**	**Class B-1 Concrete**	**Class B-2 Concrete**	**Pavement Concrete**	**Seal Concrete**
	Min	**Min**	**Min**	**Min**	**Min**	**Min**
A[c]	6.40(360)	5.60(310)	6.50(360)	7.50(420)	6.00(330)	7.00(390)
B[d]	6.80(380)	6.00(330)	6.80(380)	7.80(430)	6.00(330)	7.40(410)
C[e]	----	6.20(350)	7.00(390)	8.00(450)	6.00(330)	7.60(420)
D[f]	----	6.60(370)	7.40(410)	8.40(470)	6.00(330)	7.80(430)

[a]When coarse aggregate, Gradation F, in accordance with Sec 1005.2 is used, the cement requirements shall be increased 0.50 sack per cubic yard (30 kg/m^3) of concrete. When used, Type IP, I(PM), IS or I(SM) cement shall be substituted on a pound for pound (kg for kg) basis for Type I or Type II cement and adjustments in design mix proportions will be required to correct the volume yield of the mixture.

[b]The contractor may submit an optimized mix design which has a maximum 0.50 sack per cubic yard (30 kg/m^3) reduction in cement from that shown in the tables. If the contractor chooses this option, the mixture will be subject to review, laboratory testing and approval by the engineer. All other requirements for the cement factor will apply.

[c]Class A sand will include all sand, except manufactured sand, weighing 109 pounds per cubic foot (having a mass of 1740 kg/m^3) or more.

[d]Class B sand will include all chert, river and Crowley Ridge sand weighing from 106 to 108 pounds, inclusive, per cubic foot (having a mass of 1610 - 1730 kg/m^3 inclusive) or glacial sand weighing 108 pounds or less per cubic foot (having a mass of 1730 kg/m^3 or less).

[e]Class C sand will include all chert, river and Crowley Ridge sand weighing from 101 to 105 pounds, inclusive, per cubic foot (having a mass of 1610 - 1680 kg/m^3, inclusive).

[f]Class D sand will include all sand weighing 100 pounds or less per cubic foot (having a mass of 1600 kg/m^3 or less) and any manufactured sand that is produced by the process of grinding and pulverizing large particles of aggregate or which contains more than 50 percent of material produced by the reduction of coarser particles. Manufactured sand produced from limestone or dolomite shall not be used in Portland cement concrete for driving surfaces such as bridge decks, pavements and shoulders.

501.3.6 The weight per cubic foot ($mass/m^3$) shall be the dry rodded weight per cubic foot ($mass/m^3$) of the aggregate, determined in accordance with AASHTO T 19.

Delete Sec 501.8.8 and substitute the following: ***12/05***

501.8.8 Central or truck mixed concrete shall be delivered to the site of the work and shall meet the following conditions:

(a) The handling and discharge of concrete shall not cause segregation or damage to the concrete and will allow placement with a minimum of handling. All handling and discharge shall occur prior to initial set of the concrete.

(b) Truck mixed concrete shall not exceed 300 revolutions after the beginning of mixing.

Delete Sec 501.8.9 and substitute the following: ***12/05***

501.8.9 The discharge of concrete transported in non-agitating equipment shall not cause segregation or damage to the concrete and will allow placement with a minimum of handling. All handling and discharge shall occur prior to initial set of the concrete. Bodies of non-agitating hauling equipment shall be smooth, mortar-tight metal containers capable of discharging the concrete at a satisfactory, controlled rate without segregation.

Delete Sec 501.14.1 and substitute with the following: ***04/06***

501.14.1 Approved Class C or Class F fly ash may be used to replace a maximum of 25 percent of Type I or II cement on a pound for pound (kg for kg) basis in all concrete. Approved Class C or F fly ash may be used to replace a maximum of 10 percent of Type IP or I(PM) cement, when made with a natural pozzolan, on a pound for pound (kg for kg) basis in all concrete. Approved GGBFS may be used to replace a maximum of 25 percent of Type I or II cement on a pound for pound (kg for kg) basis in all concrete.

SECTION 502 – PORTLAND CEMENT CONCRETE BASE AND PAVMENT

Delete Sec 502.5.2 and substitute the following: ***11/05***

502.5.2 Construction Joints. Construction joints shall be made at the close of each day's work or when the work is stopped or interrupted for more than 30 minutes. Transverse construction joint shall be located 15 feet from the last contraction joint. Construction joints shall be constructed perpendicular to the top surface and the centerline of the concrete base or pavement. Construction joints may be formed with a timber header or may be sawed full depth. The final joint shall conform to the cross-section of the pavement. Before paving operations are resumed, all surplus concrete and other refuse shall be removed from the subgrade.

Delete Sec 502.5.3 and substitute the following: ***11/05; 12/05***

502.5.3 Sawing Joints. Unless otherwise provided, all transverse contraction joints and all Type L longitudinal joints shall be sawed in a single cutting operation with the joint groove cut to the dimensions shown on the plans except as herein specified. If the groove for poured type transverse joints is cut prior to removal of the forms, the groove shall be cut as close as is practical to the concrete base or pavement edge, and the resulting crescent shaped plug in the groove, immediately adjacent to the form, will be acceptable. For intersections and irregular pavement, joints shall be sawed at locations as approved by the engineer. Sawing of the joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling. All joint grooves shall be established before uncontrolled shrinkage cracking takes place. The sawing of any joint shall be omitted if a crack occurs at or near the joint location prior to the time of sawing. Sawing shall be discontinued when a crack develops ahead of the saw. The engineer reserves the right to have the contractor install preformed type joints on multiple width construction when the use of sawed joints fails to prevent random cracking. Any joint that opens more than ¼ inch (6 mm) shall be sealed. Any pavement with random cracking not controlled by dowels or tie bars shall be either removed and replaced using dowels or tie bars as appropriate to the nearest controlled joint or repaired with some other method approved by the engineer at the contractor's expense.

Delete Sec 502.5.4 and substitute the following: ***11/05***

502.5.4 Sealing Joints. All sawed contraction joints shall be unsealed, unless otherwise specified. Sawed or formed expansion joints shall be sealed with joint sealing material before the pavement is opened to any traffic, including construction traffic. Immediately prior to sealing, the joints shall be thoroughly cleaned and dried. The sealing material shall be heated to the pouring temperature recommended by the manufacturer. Any material which has been heated above the maximum safe heating temperature will be rejected. Any excess material shall be removed from the pavement surface.

Delete 502.10.1 and substitute the following: ***11/05***

502.10.1 Lot Definition. A lot shall be the surface area placed in a single day. Each lot shall be divided into no less than four or more than six sublots of equal surface area. For high daily production rates exceeding 7500 square yards (6275 m^2) per day, the contractor may choose to divide the day's production into two equal lots consisting of

no less than four or more than six sublots each. The contractor shall notify the engineer of the size of the sublot or of the decision to divide a day's production into two equal lots prior to taking any core samples. When a day's production involves less than 600 square yards (500 m^2), combine the following day's or days' production to reach 600 square yards (500 m^2) and treat as a single lot, except while completing a particular mix design or project, in which case combine with the previous day's production and treat as a single lot. If a project has less than 7500 square yards (6275 m^2) of a particular mix type, the lot will be defined as the plan quantity shown in the contract documents.

Delete Sec 502.11.1 and substitute the following: ***12/05***

502.11.1 Quality Control Plan. Prior to approval of concrete mix designs by the engineer, the contractor shall submit a QCP to Construction and Materials. The QCP shall be approved prior to placing any concrete. The QCP shall include:

(a) Name and contact information should be provided for the contractor's representative in charge of QC and the project level representative if different from the contractor's representative.

(b) Identify the number of sublots each lot will utilize and describe how lots and sublots will be designated.

(c) State the method for determining when concrete cores can be extracted.

(d) State the method for demonstrating the concrete has been protected from freezing.

(e) State the location where control charts will be posted.

(f) For optimized concrete mix, state the target gradation and allowable gradation ranges for each fraction being used.

(g) A proposed independent third party company name, contact person, address, and phone number for dispute resolution.

Delete Sec 502.11.2 and substitute the following: ***04/06***

502.11.2 Quality Control Testing. The contractor shall perform all quality control tests necessary to control the production and construction processes applicable to this specification and as set forth in the QCP. Quality control testing shall be performed by technicians qualified through MoDOT's technician certification program. Testing shall include, but not necessarily be limited to, aggregate gradation and deleterious material, course aggregate absorption, thin or elongated pieces, aggregate moisture content, entrained air content and slump.

Insert Sec 502.11.2.1.3 through 502-11.2.1.5 as follows: ***04/06***

502.11.2.1.3 Absorption. Samples for coarse aggregate absorption shall be taken from the discharge gate of the storage bins or from the conveyor belt at least once every 2000 cubic yards (1500 m^3) with a minimum of once per project. Coarse aggregate absorption shall be in accordance with AASHTO T 85.

502.11.2.1.4 Thin or Elongated Pieces. Thin or elongated pieces shall be determined on samples of coarse aggregate taken from the discharge gate of the storage bins or from the conveyor belt. The aggregate particles retained on the 3/4 in. (19.00 mm) sieve shall be tested in accordance with ASTM D 4791 at least once every 10,000 cubic yards with a minimum of once per project, based on a 5:1 ratio.

502.11..2.1.5 Retained Samples. All aggregate samples taken by the contractor, including but not limited to gradation, deleterious, absorption, and thin or elongated pieces shall be retained for the engineer for a minimum of seven days unless otherwise instructed. The retained sample shall be the remaining half of the final reduction in sample size obtained for QC testing. These samples shall be maintained in clean covered containers, without contamination, readily accessible to the engineer. The retained sample's identification shall consist of, but is not limited to:

(a) Time and date sampled.

(b) Product specification number.

(c) Type of sample, i.e. belt, bin, stockpile.

(d) Lot and sublot designation.

(e) Sampler/Tester.

(f) Project Job Number.

Delete Sec 502.11.3.1 – 502.11.3.2 and substitute the following: ***11/05, 04/06***

502.11.3.1 Fine and Coarse Aggregate Gradation . The contractor shall record the gradation tests for each control sieve on linear control charts. Specification limits from Sec 1005, Sec 501.3, or the limits established in the QC plan for optimized mixtures, shall be superimposed on the control chart for job control.

502.11.3.2 Slump and Air Content and Absorption. The contractor shall maintain linear control charts for both individual measurements of slump air content, and absorption in accordance with the following action limits. The individual measurement control charts shall use the mix design target values as indicators of central tendency.

Individual Measurements	
Control Parameter	**Action Limit**
Slump	+1 in. (25 mm)
Air Content	4.5 to 5.0%
Absorption	2.0 to 2.5%

Delete Sec 502.11.4.1 and substitute the following: ***11/05, 04/06***

502.11.4.1 Fine and Coarse Aggregate Gradation and Deleterious Content. When one test is outside the specification limits, immediate steps, including a halt to production, shall be taken to correct the gradation, and deleterious content.

Delete Sec 502.11.4.3 and substitute the following: ***04/06***

502.11.4.3 Slump, Air Content, and Absorption. The contractor shall halt production and make appropriate adjustments whenever either of the following occurs:

(a) One point falls outside the action limit line for individual measurements or range.

(b) Two points in a row fall outside the specification limit but within the action limit line for individual measurements.

Insert Sec 502.11.5 and renumber sections accordingly: ***12/05***

502.11.5 Shoulders. Full depth shoulders shall be inspected in accordance with requirements applied to concrete placed in the travel way. For Type A2 shoulders, the following shall apply:

(a) QC shall determine compressive strength at a frequency of no less than one per 7500 square yards. Compressive strength shall be determined from at least two 6- by 12-inch (150- by 300-mm) cylinders made in accordance with AASHTO T-23 or by the Maturity Method in accordance with the contract documents. QA will determine the compressive strength at least once per 30000 square yards. Cylinders shall be tested in accordance with AASHTO T-22. Sampling locations will be determined by the engineer using random sampling procedures in accordance with ASTM D 3665

(b) QC shall determine pavement thickness of the fresh concrete at a frequency of no less than one per 7500 square yards. QA will determine the pavement thickness of the fresh concrete at least once per 30000 square yards. Sampling locations will be determined by the engineer using random sampling procedures in accordance with ASTM D 3665

(c) QC shall determine the slump, air content, moisture content, gradation and deleterious in accordance with Sec 502.11. QA will determine the slump, air content, moisture content, gradation and deleterious in accordance with Sec 502.12.

502.11.6 Dispute Resolution. When there are significant discrepancies between the engineer's and the contractor's test results, dispute resolution procedures will be used.

502.11.6.1 Cease Work. The contractor's operations may be required to cease until the dispute is resolved, if the test results indicate the mixture is subject to failure.

502.11.6.2 Third Party Resolution. The first step in dispute resolution will be to identify differences in procedures and to correct inappropriate procedures before moving to third party resolution. If that does not resolve the dispute, either the contractor or the engineer may request the approved QCP third party involvement. The recommendations of the approved third party will be binding on both the engineer and contractor.

502.11.6.3 Third Party Payment. The contractor shall be responsible for the costs associated with third party testing and resolution if the final result indicates the engineer's test results were correct. Likewise the Commission will be responsible for the cost associated with the third party testing and resolution if the final result indicates the contractor's results were correct.

502.11.6.4 Other Adjustments. The contractor will not be entitled to any additional payment for costs incurred due to use of the dispute resolution procedures such as, but not limited to, those for delay, cessation of operations, costs to subcontractors, etc. The engineer may give consideration to adjustment of working days, if warranted.

Delete Sec 502.12 in its entirety, insert Sec 502.12 as follows and renumber subsequent sections accordingly: 04/06

502.12 Quality Assurance. Corrective action shall be required in accordance with Sec 502.11.4 for any QA tests outside the action limit. The engineer will at a minimum, independently test at the following frequency:

Test	Frequency
Compressive Strength	1 per lot
Thickness	1 per lot
Surface Texture	1 per lot
Slump	1 per day
Entrained Air Content	1 per day
Aggregate Gradation	1 per 2 days
Aggregate Moisture	1 per 2 days
Aggregate Absorption	1 per 10,000 cubic yards
Thin or Elongated Pieces	1 per project

502.12.1 Retained Samples. The retained portion of the QC samples for aggregate gradation and deleterious content will be tested at a frequency no less than once per week. The QA inspector will test at least twenty percent of the QC retained samples for absorption and thin or elongated pieces. Retained samples will be chosen at random. A comparison will be considered favorable when the QA results of a QC retained sample are within the applicable limits specified in Sec 403.18.2 and the absorption is within the specification limits.

502.12.2 Quality Control Equipment. All QC mixture testing shall be performed using equipment maintained in accordance with Sec 403.17.3, except as follows:

Equipment – Test Method (AASHTO)	Requirement	Interval (Month)
Sieves	Check Physical Condition	6
Mechanical Shakers - T27	Check Sieving Thoroughness	12
Ovens	Verify Temp. Settings	4
Balances	Verify	12[a]
Air Meters - T152	Calibrate	12
Compression Testing Machine - T22	Verify Load Indications	12
Capping Material	Check Strength	3
Slump Cones - T119	Check Critical Dimensions	12

[a]Verify after each move.

Delete Sec 502.15.3.1 and substitute the following: ***12/05***

502.15.3.1 Incentives. Smoothness incentive will be paid per section based on the profile index before any corrections. If diamond grinding is the final texture of the pavement surface, smoothness incentive will be paid per section based on the profile index after diamond grinding. If after applying the surface texture, the contractor elects to diamond grind the entire project, the smoothness incentive will be paid per section based on the profile index after diamond grinding. Within a section qualifying for incentive pay, any segment having a profile index requiring correction will not be included in incentive payment for that section.

Delete Sec 502.15.3.2 and substitute the following: ***12/05***

502.15.3.2 Deductions. Corrected areas will be considered marred surfaces. A deduction of 20 percent of the contract price will be made for the affected area. Continuous corrective action performed on the entire pavement width for a length of 0.1 mile (0.2 km) or more, but not the entire section, will not be considered a marred surface but will not be eligible for the smoothness incentive. Continuous corrective action performed on the entire pavement width of an entire section will not be considered a marred surface and will be eligible for the smoothness incentive. Constant-width acceleration and deceleration lanes shall be considered as mainline pavements.

Table I	
Profile Index, Inches Per Mile (mm/km)	**Percent of Contract Price**
10.0 (158) or less	105
10.1 - 15.0 (159 - 237)	103
15.1 - 25.0 (238 - 395)	100
25.1 (396) or greater	100[a]

Table II	
Profile Index, Inches Per Mile (mm/km)	**Percent of Contract Price**
20 (316) or less	103
20.1 - 45.0 (317 - 711)	100
45.1 (712) or greater	100[b]

[a]After correction to 25.0 inches per mile (395 mm/km) or less.
[b]After correction to 45.0 inches per mile (711 mm/km) or less.

Delete Sec 502.15.3.5 and substitute the following: ***12/05***

502.15.3.5 Incentive Exception. The contractor will not be allowed to make corrective grinding to increase the percent of pay when the final profile index is 25.0 (395) or less (Table I), or 45.0 (711) or less (Table II). If the contractor elects to diamond grind the entire project, the smoothness incentive will be paid per section based on the profile index after diamond grinding.

Delete Sec 502.15.4 and substitute the following: ***11/05***

502.15.4 Compensation. The contract unit price for Portland cement concrete base and pavement will be considered as full compensation for all material, including reinforcement, dowels, dowel supports, tie bars and any other items entering into the construction of the traveled way pavement or Portland cement concrete shoulders, and for the cost of QC testing and smoothness testing. No additional compensation will be allowed for any excess thickness.

Delete Sec 502.15.8 and renumber sections accordingly: ***11/05***

502.15.8 Small Quantities. For each mix type less than 7500 square yards (6275 m^2), the following shall apply:

QLA and PWL will not be required.

Concrete mix shall be within the specified limits for compressive strength, pavement thickness, slump, air content, gradation and deleterious.

Payment for each mix type will be made at 100 percent of the contract unit price if compressive strength is equal to or greater than 3500 psi (24 Mpa) and the pavement thickness is not deficient by more that 10 percent of the plan thickness.

Insert Sec 502.15.9 and renumber sections accordingly: ***12/05***

502.15.9 Shoulders. For Type A2 shoulders, the following shall apply:

(a) QLA and PWL will not be required

(b) Concrete mix shall be within the specified limits for compressive strength, pavement thickness, slump, air content, gradation and deleterious

(c) Payment will be made at 100 percent of the contract unit price if compressive strength is equal to or greater than 3500psi (24MPa) and pavement thickness is not deficient by more than 10 percent of the plan thickness

502.15.10 PWL Determination Table. Values in Table III are estimates of the PWL corresponding to specific values of the Quality Index (Q). For Q values less than zero, the table shall be subtracted from 100. (See Table III on pages 265-270 in the 2004 Standard Specifications Handbook).

SECTION 505 – BRIDGE DECK CONCRETE WEARING SURFACE

Amend Sec 505.10 to include the following: ***04/05***

505.10.2.1.1 Gradation D may be used when the plan thickness of the bridge deck overlay is 3 inches or greater.

Delete Sec. 505.10.8.13 and substitute the following: ***04/05***

505.10.8.13 After texturing the concrete surface, but before applying the wet cure, all vertical joints with the adjacent concrete shall be sealed by painting with thinned grout consisting of equal parts cement, sand and sufficient water for the mixture to be the consistence of paint.

Delete Sec. 505.10.8.15 and substitute the following: ***04/05***

505.10.8.15 The wet cure shall be applied within 30 minutes after the concrete has been placed on the deck, except when the surface will be excessively marred by so doing, as determined by the engineer. If the concrete requires refinishing because of failure to meet density requirements, the time will be extended 15 minutes. Failure to apply wet cure within the required time shall be cause for rejecting the work affected. Surface concrete in the rejected area shall be removed and replaced by the contractor at the contractor's expense.

Delete Sec. 505.10.8.16 and substitute the following: ***04/05***

505.10.8.16 The surface shall receive a wet cure of at least 72 hours.

Delete Sec. 505.20.8.3 and substitute the following: ***04/05***

505.20.8.3 Texturing shall occur immediately after finishing and before the plastic film forms on the surface. Texturing shall be performed in a manner to prevent pulling the concrete away from an existing vertical face. Care shall be taken not to texture too deep and not to tear the surface.

Delete Sec. 505.20.8.6 and substitute the following: ***04/05***

505.20.8.6 The wet cure shall be applied promptly after the concrete has been placed on the deck without deforming the finished surface.

Delete Sec. 505.20.8.7 and substitute the following: ***04/05***

505.20.8.7 The surface shall receive a wet cure for at least 48 hours.

Delete Sec. 505.20.9.2 and substitute the following: ***04/05***

505.20.9.2 No latex modified concrete shall be placed at ambient or deck surface temperatures below 45° F (7° C). Latex modified concrete shall be protected to maintain a minimum specified curing temperature of 45° F (7° C). Any concrete damaged by freezing or which is exposed to a temperature of less than 45° F (7° C) during the first 8 hours after placement shall be removed and replaced at the contractor's expense.

Delete Sec. 505.30.3.1 and substitute the following: ***04/05***

505.30.3.1 The contractor shall submit a mix design to Construction and Materials with the following properties:

Property	Requirement
Air Content, percent, minimum	5.0
Slump, inches (mm), maximum	6 (150)
Cement Content, sacks/cubic yard (kg/m^3), minimum	6.4 (363)
Water/Cementitous Ratio, lbs. (kg) water/lbs. (kg) cementitous materials, max.	0.37
Silica Fume, % solids by weight (mass) of cement	6 - 8
Percent Fine Aggregate (as percent of total fine and coarse aggregate by absolute volume)	50 – 55
High Range Water Reducer	As required

Delete Sec. 505.30.8.3 and substitute the following: ***04/05***

505.30.8.3 The surface shall receive a wet cure for at least 7 days. Time when the ambient temperature is below 45° F (7° C) will not be counted as cure time. Cure shall be continued if 3000 psi (21 MPa) compressive strength has not been attained.

SECTION 506 – CONCRETE OVERLAYS FOR PAVEMENTS

Delete Sec 506.20.3.3.1 and substitute the following: ***11/05***

506.20.3.3.1 Tie bar, dowel bar and joint saw depths shall be as shown on plans. Tie bars will be required for the centerline.

Delete Sec 506.20.3.3.3 and substitute the following: ***04/05***

506.20.3.3.3 New transverse joints will not be required to match existing transverse joints, except new transverse expansion joints shall be cut or placed to match the underlying joint configuration.

SECTION 606 – GUARDRAIL, CRASHWORTHY END TERMINALS, ONE-STRAND ACCESS RESTRAINT CABLE AND THREE-STRAND GUARD CABLE

Delete Sec 606.10.2.3.1 and substitute the following: ***11/05***

606.10.2.3.1 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Specification
Delineators	1065

Delete Sec 606.10.2.3.2 – 606.10.2.3.4 and substitute the following: ***11/05***

606.10.2.3.2 Construction Requirements.

606.10.2.3.2.1 Delineator reflector colors shall correspond with pavement marking. Delineators shall be sheeted on one side, facing oncoming traffic, unless otherwise specified. Where guardrail divides opposing lanes of travel, the delineators shall have retroreflective sheeting on both sides corresponding to adjacent pavement markings. Guardrail located on ramps shall have red reflective sheeting placed on the reverse side of the reflector.

606.10.2.3.2.2 Delineators will be installed according to manufacturer's recommendations.

606.10.2.3.2.3 Any damaged or missing delineators shall be replaced by the contractor at the contractor's expense.

Delete Sec 606.10.4 and substitute the following: ***11/05***

606.10.4 Basis of Payment. The accepted quantities of guardrail, bridge anchors, end anchors, transition sections and bullnose guardrail systems, complete in place, will be paid for at the contract unit price for each of the pay items included in the contract. No direct payment will be made for end sections or terminal connectors. No direct payment will be made for setting posts in rock. No direct payment will be made for guardrail delineators provided on new guardrail. Delineators specified for installation on existing guardrail will be measured and paid for per each.

Delete Sec 606.50.2.5 and substitute the following: ***11/05***

606.50.2.5 Delineators. Delineator spacing and reflector colors shall be in accordance with Sec 617.30.

Delete Sec 606.50.4 and substitute the following:

606.50.4 Basis of Payment. The accepted quantities of three-strand guard cable, end anchors, posts, hardware and aggregate bedding will be paid for at the contract unit price for each of the pay items included in the contract. No

direct payment will be made for setting posts in rock. No direct payment will be made for guard cable delineators provided on new guard cable. Delineators specified for installation on existing guard cable will be measured and paid for per each.

SECTION 607 – FENCING

Amend Sec 607.10 to include the following: ***11/05***

607.10.3.5 Post braces shall be installed for each gate, corner, pull and end post. The brace shall extend from the mid point of the gate, corner, pull and end post to the midpoint of the adjacent line post. A truss rod shall be connected to the midpoint of the line post and run back to the bottom of the gate, corner, pull and end post. The truss rod shall be equipped with a turnbuckle or other equivalent device for adjustment.

SECTION 612 – IMPACT ATTENUATORS

Delete Sec 612.4.1 and substitute the following: ***04/05***

612.4.1 Truck Mounted Attenuator. A truck mounted attenuator (TMA) shall be used for all moving operations conducted under traffic and as specified in the contract. Each TMA shall consist of a TMA unit, a support vehicle, and truck-mounted flashing arrow panel. Any damaged TMA shall be removed from service and either repaired or replaced to the satisfaction of the engineer.

SECTION 613 – PAVEMENT REPAIR

Delete Sec 613.2 and substitute the following: ***11/05***

613.2 Material. All material, unless specified otherwise in this specification, shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Epoxy or Polyester Bonding Agents for Dowels	1039
Concrete Curing Material	1055
Material for Joints	1057

Delete Sec 613.10.1 and substitute the following: ***11/05***

613.10.1 Description. Full depth pavement repairs shall consist of removing specified areas of existing variable thickness Portland cement concrete pavement and subsequent bituminous overlays and replacing the removed material with non-reinforced Portland cement concrete as shown on the plans.

Delete Sec 613.10.2.2 and substitute the following: ***11/05***

613.10.2.2 All full depth pavement repairs exceeding 30 feet (9 m) in length shall be constructed with tie bars along the longitudinal centerline joint in accordance with Sec 502. Dowel bars, tie bars and holes shall be as shown on the plans. Dowel bars shall be epoxy coated. Tie bars shall be No. 6 bars, 18 inches (450 mm) long and epoxy coated. Bar holes shall be drilled to the specified diameter and to the depth shown on the plans. Equipment designed to drill multiple holes simultaneously will only be allowed provided such equipment causes no damage to existing pavement. The holes shall be blown clean and allowed to dry. The holes shall be injected with an approved epoxy or polyester bonding agent in accordance with Sec 1039.30 and shall fill the voids around the bar. The bonding agent shall be thoroughly mixed in accordance with the manufacturer's recommendations prior to injection into the holes. The bonding agent shall be injected into the hole by inserting the injection device to the back of the hole and slowly withdrawing the device while dispensing sufficient material to completely fill the void around the bar when inserted. Other methods may be used as approved by the engineer. The contractor shall use a method to prevent the bonding agent from flowing from the hole during placement of the bar and to create an effective face at the entrance of the hole. The bar shall be inserted into the hole with a twisting motion so the material in the back of the hole is forced up and around the bar. The bars shall be placed parallel to the surface and the centerline of the traveled way and shall not vary more than 1/4 inch (6 mm) in alignment. Bars shall be firmly seated prior to placing concrete.

Delete Sec 613.20.2.1.1 and substitute the following: ***04/05***

613.20.2.1.1 Concrete shall be in accordance with the following requirements. Compressive strength specimens shall be prepared in accordance with current MoDOT methods and cured to simulate actual field conditions. Testing of compressive specimens shall be performed by methods and at facilities acceptable to the engineer. A new trial mix may be required if the engineer determines the field conditions vary substantially from trial mix conditions. The coarse aggregate for the concrete shall be Gradation F in accordance with Sec 1005 or an optimized aggregate gradation approved by the engineer. The optimized aggregate gradation shall have 100 percent passing the 1/2 inch (12.5 mm) sieve and no more than five percent retained on the 3/8 inch (9.5 mm) sieve.

Property	Requirement
Compressive Strength in 4 hours [a]	1600 psi (11 MPa), min.
Compressive Strength in 24 hours	4000 psi (28 MPa), min.
Air Content	4 percent, min.
Slump	1 inch (25 mm), max.

[a]The cure time shall be the time determined to reach this compressive strength. The roadway may be opened to traffic when this compressive strength has been attained.

Delete Sec 613.20.3.1.2 and substitute the following: ***04/05***

613.20.3.1.2 Milling. Milling equipment shall be in accordance with Sec 622.10. The equipment shall be equipped with a device for stopping at a preset depth. Milling may be performed either across lanes or parallel to the pavement centerline. After milling, the bottom of the repair area shall be checked by sounding to ensure all unsound material has been removed. Any unsound material remaining shall be chipped free. When milling is performed, light pneumatic tools shall be used to form a vertical face where the milling machine started and ended. The repair boundaries and edges shall be uniform. The maximum allowable pneumatic hammer weight (mass) for chipping shall be 15 pounds (7kg). If excessive concrete is removed, or if dowel bars or reinforcement are damaged to the extent to require full depth pavement repair, the cost for the repair shall be at the contractor's expense.

Delete Sec 613.20.3.7 and substitute the following: ***04/05***

613.20.3.7 Acceptance. All pavement repairs will be sounded by the engineer prior to acceptance. Sounding will not be performed until the repair material has reached design compressive strength and the repair has been open to traffic for a minimum of 30 days. If sounding indicates unsound material, the entire pavement repair shall be removed to the limits designated by the engineer and replaced by the contractor at the contractor's expense.

Delete Sec 613.20.4.1 and substitute the following: ***04/05***

613.20.4.1 Measurement for repairing spalled areas, cracks or joints will be made to the nearest 1/10 square yard (0.1 m^2). Any material removed beyond the repair area designated by the engineer due to the removal methods used by the contractor will not be included in the measurement for pavement repair. Measurement of all concrete material furnished and placed in the repair of spalled areas, cracks or joints will be made to the nearest 1/10 cubic yard (0.1 m^3). Measurement for the saw cut to re-establish the joint or crack will be made to the nearest linear foot (0.5 m).

SECTION 614 – DRAINAGE FITTINGS

Delete Sec 614.10.4 – 614.10.5 and substitute the following: ***04/05***

614.10.4 Basis of Payment. The accepted quantity of parallel bar grates and bearing plates, and curved vane grates and frames will be paid for at the contract unit price for each of the items included in the contract.

SECTION 616 – TEMPORARY TRAFFIC CONTROL

Delete Section 616.2 and replace with the following: ***04/05***

616.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Temporary Traffic Control Devices	1063

SECTION 617 – CONCRETE TRAFFIC BARRIER

Delete Sec 617.30.2 and substitute the following: ***11/05***

617.30.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Specification
Delineators	1065

Delete Sec 617.30.3.1 – 617.30.3.2.1 and substitute the following: ***11/05***

617.30.3.1 Delineators shall be placed on all concrete traffic barrier spaced at 50-foot (15 m) intervals.

617.30.3.2 Delineator reflector colors shall correspond with pavement marking. Delineators shall be sheeted on one side, facing oncoming traffic, unless otherwise specified. Where permanent concrete traffic barrier divides opposing lanes of travel, the delineators shall have retroreflective sheeting on both sides corresponding to adjacent pavement marking.

617.30.3.2.1 Delineators mounted on permanent concrete traffic barrier shall be anchored with galvanized mechanical fasteners that prevent movement in accordance with the manufacturer's recommendations.

SECTION 620 – PAVEMENT MARKING

Delete Sec 620.50.2 and substitute the following: ***11/05***

620.50.2 Material. Traffic paint shall be used as specified on the plans or as approved by the engineer. Material for application of traffic marking paint shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Drop-On Glass Beads	1048.50.5
Acrylic Copolymer Fast Dry Pavement Marking Paint	1048.100
High Build Acrylic Waterborne Pavement Marking Paint	1048.110

Delete Sec 620.50.3.4.3 and substitute the following: ***11/05***

620.50.3.4.3 Paint shall be applied to a minimum wet thickness of 20 mils (0.500 mm). The wet film thickness of the applied paint shall be tested with a paint thickness gauge as directed by the engineer.

Delete Sec 620.50.4 and substitute the following: ***11/05***

620.50.4 Method of Measurement. Measurement of 4-inch (100 mm), 6-inch (150 mm), 8-inch (200 mm), 12-inch (300 mm) and 24-inch (600 mm) pavement marking paint will be made in accordance with Sec 620.10.3.2.

SECTION 626 – RUMBLE STRIPS

Delete Sec 626 and substitute the following: ***11/05***

SECTION 626
RUMBLE STRIPS

626.1 Description. This work shall consist of constructing rumble strips as shown on the plans or as directed by the engineer.

Delete Sec 626.2 and substitute the following; ***12/05***

626.2 Construction Requirements. Rumble strips shall be milled into bituminous and concrete pavements to produce a neat and uniform finish. Milled material shall be handled in accordance with Sec 622. Any damage to the pavement or pavement marking resulting from the contractor's operations shall be repaired or replaced to the satisfaction of the engineer by the contractor, at the contractor's expense.

626.3 Method of Measurement. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Where required, rumble strips will be measured separately for each shoulder and the centerline, which will be measured along the centerline of the travel way, and made to the nearest 1/10 station (5 m). The revision or correction will be added to or deducted from the contract quantity.

Delete Sec 626.4 and substitute the following: ***12/05***

626.4 Basis of Payment. The accepted quantity of rumble strips will be paid at the contract unit price per 1/10 station (5 m). Payment will be considered full compensation for all labor, equipment, and material necessary to complete the described work, including loading, hauling, stockpiling and disposal of milled material; and any other incidental items.

SECTION 701 – DRILLED SHAFTS

Delete Section 701.4.7.1 and substitute the following: ***11/05***

701.4.7.1 Time Restrictions. The integrity of the drilled shaft excavation shall be maintained by the placing of reinforcement and concrete in a timely manner following completion of the excavation. No two adjacent shafts shall be excavated at the same time, and shafts shall not be constructed within 24 hours of the completion of an adjacent shaft if the center-to-center spacing is less than 3 shaft diameters.

SECTION 702 – LOADING-BEARING PILES

Delete Sec 702.4.11 and substitute the following: ***11/05***

702.4.11 Minimum and Maximum Limits of Pile Driving. Piles shall be driven to at least the minimum tip elevation indicated on the plans. If no minimum tip elevation is shown on the plans, piles shall have a tip elevation at least 10 feet (3 m) below the bottom of the supported footing or 10 feet (3 m) below the natural ground line, whichever is lower, unless specifically authorized otherwise by the engineer. Piles other than structural steel piles shall be driven to attain a bearing value no less than that shown on the plans, determined in accordance with Sec 702.4.10. Structural steel piles shall in general be driven to practical refusal, which will be defined as a pile bearing value of 1.9 times the design bearing value. Prior to driving structural steel piles, the contractor shall review the boring logs to determine the depth at which rock may be anticipated. The contractor shall be attentive to the physical conditions of practical refusal. When indication of practical refusal occurs, driving shall cease immediately to avoid damage to the pile and to reduce the risk of injury.

SECTION 706 – REINFORCING STEEL FOR CONCRETE STRUCTURES

Delete Sec 706.3.1 and substitute the following: ***11/05***

706.3.1 Reinforcing steel shall be protected from damage at all times. When placed in the work and before concrete is placed, reinforcing steel shall be free from dirt, oil, paint, grease, loose mill scale, thick rust, any dried mortar and other foreign substances. A thin layer of powdery rust may remain. All reinforcing steel required for superstructure concrete, such as slabs, girders and beams and top slabs of culverts with more than a 4-foot (1.2 m) span, shall be held securely in correct position with approved metal or plastic apparatus. Securing apparatus shall consist of supports, ties, clips, and other devices capable of holding reinforcing bars against displacement. For bridge decks and top slabs of culverts, bars in the top mat shall be firmly secured at each cross or lap. At other locations, the bars shall be firmly secured at alternate crossings or closer. The steel shall be secured in the correct position with proper clearance maintained between the forms and the reinforcement. The contractor shall construct the unit in accordance with the plans. Measurements to reinforcing steel will be made to the centerline of bar, except where the clear distance from face of concrete is shown on the plans.

SECTION 725 – METAL PIPE AND PIPE ARCH CULVERTS

Delete Sec. 725.4 and substitute the following: ***01/05***

725.4 Inspection. The internal diameter of the barrel shall not be reduced by more than ten percent of the pipe's nominal inside diameter when measured no less than 30 days following completion of installation. After the roadway has been completed and before final inspection of the project, the engineer will inspect all pipe locations for proper installation. Any section of pipe found to be improperly installed shall be replaced or repaired by the contractor, at the contactor's expense and to the satisfaction of the engineer. Repaired or replaced pipe will be re-inspected by the engineer. The contractor shall provide equipment and assistance deemed necessary by the engineer to perform any testing. Pipe deflections will be determined by the engineer by having the contractor either pushing or pulling a mandrel through the pipe or verifying deflections by other methods approved by the engineer. Mandrels used for deflection testing may have either fixed or adjustable arms, but shall be approved by the engineer prior to use. The following will constitute improper installation:

(a) If any horizontal or vertical alignment is in excess of 15 percent from plan alignment, will restrict flow or will cause excessive ponding within the pipe.

(b) Any section of pipe with a diameter deflection greater than ten percent, based upon the units of measurement used in fabricating the pipe.

(c) If settlement is greater than one inch (25 mm) at five percent or more joints.

(d) If the pipe shows evidence of being crushed at any location.

(e) If the pipe shows evidence of joint separation.

SECTION 726 – RIGID PIPE CULVERTS

Delete Sec. 726.4 and substitute the following: ***01/05***

726.4 Inspection. After the roadway has been completed and before final inspection of the project, the engineer will inspect all pipe locations for proper installation. Any section of pipe found to be improperly installed shall be replaced or repaired by the contractor, at the contactor's expense and to the satisfaction of the engineer. Any separation at joints deemed not detrimental to the pipe performance by the engineer shall be resealed with either plastic joint compound, cement mortar or other approved material in accordance with Sec 726.3.1. Repaired or replaced pipe will be re-inspected as deemed necessary by the engineer. The contractor shall provide equipment deemed necessary by the engineer to perform any testing. The following will constitute improper installation:

(a) If any horizontal or vertical alignment is in excess of 15 percent from plan alignment, will restrict flow or will cause excessive ponding within the pipe.

(b) If settlement is greater than one inch (25 mm) at five percent or more joints.

(c) If the pipe shows evidence of separation at any location.

SECTION 727 – STRUCTURAL PLATE PIPE AND STRUCTURAL PLATE PIPE-ARCH CULVERTS

Delete Sec. 727.4 and substitute the following: ***01/05***

727.4 Inspection and Replacement. Inspection and replacement of structural plate pipe and pipe-arch culverts shall be in accordance with Sec 725.4, except deflection testing and maximum deflection allowed will not apply.

SECTION 728 – CORRUGATED POLYVINYL CHLORIDE CULVERT PIPE

Delete Sec. 728.3.5 and substitute the following: ***01/05***

728.3.5 Inspection. The internal diameter of the barrel shall not be reduced by more than 7.5 percent of the pipe's nominal inside diameter when measured no less than 30 days following completion of installation. After the roadway has been completed and before final inspection of the project, the engineer will inspect all pipe locations for proper installation. Any section of pipe found to be improperly installed shall be replaced or repaired by the contractor at the contactor's expense to the satisfaction of the engineer. Repaired or replaced pipe will be re-inspected by the engineer. The contractor shall provide equipment and assistance as deemed necessary by the engineer to perform any testing. Pipe deflections will be determined by the engineer by having the contractor pushing or pulling a mandrel through the pipe, or verifying deflections by other methods approved by the engineer. Mandrels used for deflection testing may have either fixed or adjustable arms, but shall be approved by the engineer prior to use. The following will constitute improper installation:

(a) If any horizontal or vertical alignment is in excess of 15 percent from plan alignment, will restrict flow or will cause excessive ponding within the pipe.

(b) Any section of pipe with deflections greater than 7.5 percent, based upon the units of measurement used in fabricating the pipe.

(c) If settlement is greater than one inch (25 mm) at five percent or more joints.

(d) The pipe shows evidence of being crushed or buckled at any location.

(e) The pipe shows evidence of joint separation.

SECTION 730 – CORRUGATED POLYETHYLENE PIPE CULVERTS

Delete Sec. 730.3.5 and substitute the following: ***01/05***

730.3.5 Inspection. The internal diameter of the barrel shall not be reduced by more than five percent of the pipe's nominal inside diameter when measured no less than 30 days following completion of installation. After the roadway has been completed and before final inspection of the project, the engineer will inspect all pipe locations for proper installation. Any section of pipe found to be improperly installed shall be replaced or repaired by the contractor at the contactor's expense and to the satisfaction of the engineer. Repaired or replaced pipe will be re-inspected by the engineer. The contractor shall provide equipment and assistance as deemed necessary by the engineer to perform any testing. Pipe deflections will be determined by the engineer by having the contractor either pushing or pulling a mandrel through the pipe, or verifying deflections by other methods approved by the engineer. Mandrels used for deflection testing may have either fixed or adjustable arms, but shall be approved by the engineer prior to use. The following will constitute improper installation:

(a) If any horizontal or vertical alignment is in excess of 15 percent from plan alignment, will restrict flow or will cause excessive ponding within the pipe.

(b) Any section of pipe with deflections greater than five percent, based upon the units of measurement used in fabricating the pipe.

(c) If settlement is greater than one inch (25 mm) at five percent or more joints.

(d) The pipe shows evidence of being crushed or buckled at any location.

(e) The pipe shows evidence of joint separation.

SECTION 805 – SEEDING

Amend Sec 805 to include the following: ***04/05***

805.3.3 All seeded areas shall be mulched in accordance with Sec 802.

SECTION 903 – HIGHWAY SIGNING

Delete Sec 903.2 and substitute the following: ***12/05***

903.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Reinforcing Steel for Concrete	1036
Highway Sign Material	1042
Delineators, Mile and Marker Posts	1044
Paints for Structural Steel	1045
Electrical Conduit	1060
Expansive Mortars	1066
Low-Carbon Steel Bolts, Nuts and Washers	1080
Structural Carbon Steel	1080
Structural Low Alloy Steel	1080
Low-Carbon Steel Anchor Bolts	1080
High-Strength Bolts, Nuts and Washers	1080
Galvanized Coating of Structural Steel, Tubular Steel Sign Supports, Sign Trusses and Appurtenances	1081

Delete Section 903.2.1 and substitute the following: ***04/06***

903.2.1 Sign Posts and Tubular Steel Sign Supports

Item	Section/Specification
Wood Posts	**1050**
Steel Pipe Posts	ASTM A 53, Grade B, or ASTM A 500, Grade B
Galvanizing of Steel Pipes Posts	ASTM A 53
Structural Steel Welding Electrodes	AWS A5.1 or AWS A5.5
Structural Steel Posts	ASTM A 36, Grade 50
U-Channel Posts	ASTM A 499, Grade 60

Delete Sec 903.3.6 and substitute the following: ***12/05***

903.3.6 Delineators. Delineators shall be installed vertically and any delineator considered unfit for use by the engineer shall be removed and replaced at the contractor's expense.

Delete Sec 903.5.5 and substitute the following: ***12/05***

903.5.5 Measurement of delineators will be made per each.

Delete Sec 903.6.3 and substitute the following: ***12/05***

903.6.3 Delineator posts will be paid for at the contract unit price. No direct payment will be made for reflective sheeting or post anchors.

SECTION 1001 – GENERAL REQUIREMENTS FOR MATERIAL

Delete Sec 1001.11 and substitute the following: ***04/06***

1001.11 Approval of Aggregate Sources. All sources of aggregate shall be evaluated by the engineer for initial approval and source approval as herein prescribed, prior to acceptance of aggregate from that source.

Delete Sec 1001.11.1 and substitute the following: ***04/06***

1001.11.1 Sources of crushed stone shall be evaluated for initial approval on a ledge by ledge basis. Each exposed ledge will be identified, and the engineer will describe the ledge boundaries. Only identified ledges shall be used in the manufacture of the final product. A sample for initial approval will be required from each ledge. Resampling will be required if source approvals indicate a significant change has occurred.

Delete Sec 1001.11.2 and substitute the following: ***04/06***

1001.11.2 Source approvals will be required a minimum of every year. Source approval samples will be required for each unique combination of ledges. Resampling will be required at closer intervals if, in the judgment of the engineer, any significant change has occurred to the source. Samples of aggregate for source approval shall be taken while the engineer is present.

Delete Sec 1001.11.3 and substitute the following: ***04/06***

1001.11.3 Sources approval of natural sand, gravel and manufactured lightweight aggregate shall be evaluated as the final product

Delete Sec 1001.11.5 in its entirety. ***04/06***

Delete Sec 1001.11.6 in its entirety. ***04/06***

Delete Sec 1001.14 in its entirety. ***04/06***

SECTION 1002 – AGGREGATE FOR ASPHALTIC CONCRETE

Delete Sec 1002.2.1.1 and substitute the following: ***04/06***

1002.2.1.1 The total coarse aggregate for asphaltic concrete shall bein accordance with Sec 1002.2.1.

Delete Sec 1002.2.1.3 and substitute the following Sec 1002.2.1.3 as follows: ***04/06***

1002.2.1.3 Crushed stone shall be obtained from rock of uniform quality. Rock tested from any combination ofindividual ledges for initial approval, source approval, and trial mix samples, shall meet the following criteria.

Property	**VALUE**
Los Angeles Abrasion, AASHTO T 96, percent loss, max	50
Absorption, AASHTO T 85, percent, max	4.0

Delete Sec 1002.4 and substitute the following: ***04/05***

1002.4 Mineral Filler. Mineral filler shall be in accordance with AASHTO M 17. Prior to approval and use of mineral filler for SMA mixtures, the manufacturer shall submit to Construction and Materials a certified test report from an approved independent testing laboratory showing specific test results when tested in accordance with applicable sections of AASHTO M17 and MoDOT Test Method TM-73. The certified test report shall contain the manufacturer's name, product, date tested and date of manufacture. In addition, the manufacturer shall submit to Construction and Materials a sample representing the mineral filler tested by the independent testing laboratory and accompanied by a material data sheet and an MSDS showing the product and composition or description of the product. The manufacturer shall guarantee that as long as the material is furnished under that brand and designation,

the material will be of the same composition as originally approved and will in no way be altered or changed. Upon approval of the mineral filler, the manufacturer and product will be placed on a list of qualified SMA mineral fillers.

SECTION 1004 – GRADED AGGREGATE FOR BITUMINOUS SURFACES

Delete Sec 1004.2 – 1004.2.2 and substitute the following: ***11/05, 04/06***

1004.2 Course Aggregate.

1004.2.1 All Coarse aggregate shall consist of sound, durable rock, free from cemented lumps or objectionable coatings. The percentage of deleterious substances shall not exceed the following values and the sum of percentages of all deleterious substances shall not exceed 8.0 percent.

Deleterious Material	Percent by Weight (Mass)
Deleterious Rock	8.0
Mud Balls and Shale Combined	2.0
Clay, uniformly dispersed	3.0
Other Foreign Material	0.5

1004.2.1.1 The total coarse aggregate for asphaltic concrete shall be in accordance with Sec 1004.2.1.

1004.2.1.2 If a density requirement is specified for asphaltic concrete, the total quantity of chert in each size or fraction of produced crushed stone aggregate, including that permitted as deleterious, shall not vary by more than 10 percentage points from the quantity present in the aggregate used in the approved laboratory job mixtures.

1004.2.1.3 Crushed stone shall be produced from rock of uniform quality. Rock tested from any combination of ledges for source approval and trial mix samples shall meet the following criteria.

Property	Value
Los Angeles Abrasion, AASHTO T 96, percent loss, max.	55
Absorption, AASHTO T 85, percent, max.	4.5

1004.2.2 Gravel aggregate shall be washed sufficiently to remove any objectionable coating and shall meet the following criteria for source approval and trial mix samples.

Property	Value
Los Angeles Abrasion, AASHTO T 96, percent loss, max.	55
Absorption, AASHTO T 85, percent, max.	5.5

1004.2.3 Steel slag consisting principally of a fused mixture of oxides and silicates shall be a synthetic aggregate produced as a by-product of basic oxygen, electric or open hearth steel making furnaces. The steel slag shall be aged at least three months after crushing and screening. Steel slag, which has been previously crushed, screened, and aged three months will not be required to receive additional aging. Steel slag from one source shall not be blended with steel slag from a different source.

SECTION 1005 – AGGREGATE FOR CONCRETE

Delete Sec 1005.2.1 and substitute the following: **04/06**

1005.2.1 All coarse aggregate for concrete shall consist of sound, durable rock, free from objectionable coatings and frozen and cemented lumps. The percentage of deleterious substances shall not exceed the following values, and the sum of percentages of all deleterious substances, exclusive of Items 5 and 6, shall not exceed 6.0 percent. For crushed stone, the percentage of wear shall not exceed 50 when tested in accordance with AASHTO T 96.

Deleterious Material	**Percent by Weight (Mass)**
Deleterious Rock	6.0
Shale	1.0
Chert in Limestone	4.0
Other Foreign Material	0.5
Material Passing No. 200 (75 µm) Sieve	
(a) Coarse Fraction, Limestone, Gradation A	2.0
(b) Fine Fraction, Limestone, Gradation A	3.0
(c) Limestone, Gradations B, D, & E	2.5
(d) Limestone, Gradation F	3.0
(e) Other Aggregates	1.0
Thin or Elongated Pieces	5.0

Delete Sec 1005.2.1.3 and substitute the following; renumber subsequent sections accordingly: ***11/05***

1005.2.1.3 Gravel shall be washed and shall be in accordance with the criteria below for initial approval. Source approval and production samples shall also meet the following criteria:

Property	**Value**
Los Angeles Abrasion, AASHTO T 96, percent loss, max.	45
Absorption, AASHTO T 85, percent, max.	4.5
Soundness, MoDOT Test Method TM 14, percent loss, max.	18.0

1005.2.1.4 The engineer reserves the right to use additional test methods, such as ASTM C 586, AASHTO T 161, AASHTO T 104 or other appropriate tests, to measure the soundness and durability of aggregate for use in concrete when deemed necessary.

SECTION 1015 – BITUMINOUS MATERIAL

Delete Sec 1015 and substitute the following: ***04/05,***

SECTION 1015

BITUMINOUS MATERIAL

1015.1 Scope. This specification covers bituminous material to be used in highway construction.

1015.2 Approval of Source. The contractor shall obtain approval of the source of bituminous material from the engineer before any shipments to the work site are made.

1015.3 Sampling, Testing and Acceptance Procedures. The supplier shall certify that the bituminous material complies with the specification requirements.

1015.3.1 Certification. The supplier shall furnish the truck driver a copy of the bill of lading, manifest or truck ticket to be available to MoDOT at the destination prior to unloading. The engineer at the source shall be furnished a copy. The bill of lading, manifest or truck ticket shall provide the following information regarding the shipment: type and grade of material, specific gravity at 60° F (15.6° C), net gallons (L), consignee, truck number, identification number, weight (mass) of truck before and after loading, destination, date loaded, name and location of the source, and a certification statement. The certification statement shall be signed by an authorized representative of the supplier and shall be substantially as follows:

> "This certifies that the bituminous material in this shipment is in accordance with MoDOT specifications for the grade specified and the weights (masses) shown hereon were obtained on MoDOT approved scales and are correct within the specified scale requirements."

1015.3.2 Sampling. The engineer will at random observe the sampling and testing of truck shipments and tanks, and will select representative samples of the material being supplied for testing in the field or in the Central Laboratory. When test results certified by the supplier are not representative of the material being shipped, the source approval will be withdrawn. A source may be reinstated when proof is furnished that the deficiency has been corrected and adequate controls are in effect to guarantee delivery of material meeting specifications. Sampling and test methods for asphalt shall be as follows:

Property	Method	RC	MC	PG
Sampling	AASHTO T 40	X	X	X
Water	AASHTO T 55	X	X	X
Flash Point (Tag Open Cup)	AASHTO T 79	X	X	
Flash Point (Cleveland Open Cup)	AASHTO T 48			X
Viscosity, Centistokes	AASHTO T 201	X	X	
Distillation	AASHTO T 78	X	X	
Penetration	AASHTO T 49	X	X	
Ductility	AASHTO T 51	X	X	
Solubility in Trichlorethylene	AASHTO T 44	X	X	X
Ash in Bituminous Material	AASHTO T 111			
Viscosity (Rotational)	ASTM D 4402			X
Dynamic Shear	AASHTO 315			X
Rolling Thin Film Oven Test	AASHTO T 240			X
Pressure Aging Test	AASHTO R28			X
Creep Stiffness	AASHTO T 313			X
Direct Tension	AASHTO T 314			X

1015.3.3 Sampling Equipment. The supplier shall furnish the required sampling equipment and shall sample the contents of the truck under the direction of the engineer. The supplier shall keep all sampling equipment clean and in good condition. Sampling devices on truck transports will be approved provided an adequately insulated valve is used with a pipe or nipple inserted a suitable distance into the tank.

1015.3.4 Truck Log. Each truck transport shall carry a log showing types of material and the dates hauled with respect to previous shipments, or the supplier shall furnish to the engineer such information with respect to the previous load.

1015.3.5 Intermediate Storage. Intermediate storage tanks for storage and transfer of material between the refinery or terminal and the point of acceptance shall be equipped for sealing and shall be reserved exclusively for MoDOT work. Use of any material from unsealed tanks will be subject to delay until material can be sampled, tested and approved.

1015.3.6 Other Transportation. At sources from which liquid bituminous material is being accepted by certification, the applicable requirements of the foregoing sections shall be followed for shipments of material in transportation units other than trucks. The certification and all information regarding each shipment shall be furnished to the engineer at the source.

1015.3.7 Railroad Shipments. For railroad shipments from refineries where inspection is not maintained by MoDOT, the supplier shall sample each car load at the source and submit the sample promptly to the Central Laboratory. A bill of lading or identification sheet shall accompany each sample and contain the following information: car number, type and grade of material, quantity represented, including gross gallons (L), temperature and net gallons (L) at 60° F (15.6° C), destination of shipment, project number and consignee. A certification statement as specified in Sec 1015.3.1 shall accompany each sample. Approval of the source may be withdrawn if samples submitted are not representative of the material shipped in the car.

1015.4 Proportioning and Blending Bituminous Material Constituents. All material shall be properly proportioned and thoroughly blended in suitable tanks prior to delivery to transportation equipment, or material may be proportioned and blended by use of automatic proportioning equipment. All automatic-proportioning blenders shall meet the approval of the engineer and shall be equipped with precision instruments, including electrically interlocked motors and automatic meters. Blending quantities of less than 8000 gallons (30,000 L) in tanks or in tank trucks will not be permitted.

1015.5 Application Temperatures for Bituminous Material.

Bituminous Material	Temperature, Degrees Fahrenheit (Celsius)			
	Spraying		Mixing	
	Min	Max	Min	Max
Asphalt Binder				
PG 46-28	260 (125)	325 (165)	----	----
All Other Grades	285 (140)	350 (175)	275 (135)	350 (175)
Liquid Asphalt RC-MC				
Grade				
30	70 (20)	150 (65)	50 (10)	110 (45)
70	100 (40)	180 (80)	90 (30)	140 (60)
250	150 (65)	220 (105)	130 (55)	170 (75)
800	180 (80)	260 (125)	170 (75)	210 (100)
3000	210 (100)	290 (145)	200 (95)	240 (115)
Asphalt Emulsions				
RS-1	70 (20)	140 (60)	----	----
RS-2	125 (50)	185 (85)	----	----
SS-1	70 (20)	160 (70)	70 (20)	160 (70)
SS-1h	70 (20)	160 (70)	70 (20)	160 (70)
CRS-1	125 (50)	185 (85)	----	----
CRS-2	125 (50)	185 (85)	----	----
CSS-1	70 (20)	160 (70)	70 (20)	160 (70)
CSS-1h	70 (20)	160 (70)	70 (20)	160 (70)
EA-90P	130 (55)	180 (80)	----	----
CRS-2P	130 (55)	180 (80)	----	----

1015.5.1 Application temperatures of other grades of emulsions shall be as specified in the contract.

1015.5.2 The spraying temperature for non-modified PG 46-28 asphalt binder shall be 260 - 325° F (125 - 165° C), and for all other higher temperature non-modified performance grades, the spraying temperature shall be 285 - 350° F (140 - 175° C). The mixing and compaction temperatures for performance graded asphalt binder shall be determined by rotational viscosity testing as defined in ASTM D 4402.

1015.5.3 When material to be applied by pressure distributor is, due to refining or blending procedures, delivered at a temperature above the specified limits, the material may be applied at the higher temperature provided satisfactory application can be obtained at the specified rate and provided sufficient precaution is exercised with respect to the fire hazard.

1015.6 Measurement of Bituminous Material. Field weight (mass) or field volumetric determinations of the material actually incorporated into the work will be used for measurement of the quantity of bituminous material for payment. The volume of material supplied from intermediate storage tanks will be determined from the net weight (mass) of the material. The net weight (mass) will be determined from the gross weight (mass) of the loaded transport vehicle used to deliver the material to the project less the empty transport vehicle weight (mass). The volume correction methods specified below will be used for determining the volume of bituminous material. Scales for determining the weight (mass) of bituminous material shall be in accordance with Sec 310.

1015.6.1 Liquid Bituminous Material and Asphalt Binder - Volumetric Determination. Measurement of the material will be based on the volume at 60° F (15.6° C). The volume correction factors of ASTM D 1250, Table 24b, will be used for converting the material from the volume at the observed temperature to the volume at 60° F (15.6° C). The volume of uncalibrated distributors and tank trucks will be determined from the net weight (mass) of the material. The net weight (mass) will be determined from the gross weight (mass) of the loaded delivery vehicle less the empty delivery vehicle weight (mass). For computing the volume in gallons (l) from weight (mass), the following formula will be used:

ENGLISH

$$G = \frac{W}{SG \times 8.328}$$

where:

G = Volume in gallons at 60° F.
W = Weight of material in pounds.
SG = Specific Gravity of material at 60° F.

METRIC

$$L = \frac{M}{SG \times 997.914}$$

where:

L = Volume in liters at 15.6° C.
M = Mass of material in kilograms
SG = Specific Gravity of material at 15.6° C.

1015.6.2 Emulsified Asphalt. Measurement of the material will be based on the volume at 60° F (15.6° C) using a coefficient of expansion of 0.0003 per degree F (0.00054 per degree C) for converting the material from the volume at the observed temperature to the volume at 60° F (15.6° C).

SECTION 1015.10 PEFORMANCE GRADED ASPHALT BINDER

1015.10.1 General. Performance graded asphalt binder shall be an asphalt-based binder produced from petroleum residue either with or without the addition of non-particulate organic modifiers. The grade shall be as specified in the contract.

1015.10.2 Basis of Acceptance. Suppliers furnishing performance graded asphalt binders to MoDOT projects by certification shall be in accordance with AASHTO R 26, except as noted herein. To become pre-qualified to furnish material, a written request shall be sent to Construction and Materials, along with a copy of the supplier's QC plan. Split samples may be required. Changes in formulation, base stock or methods of manufacture of qualified performance graded binders shall be noted and may require requalification.

1015.10.2.1 Quality Control Plan Requirements. The QC plan shall be in accordance with AASHTO R 26 with the following exceptions and modifications:

(a) The plan shall be written to cover multiple terminals or shipping facilities, in addition to the primary manufacturing facility, provided specific requirements for each location are clearly stated.

(b) The plan shall state the lot size used to designate the frequency of QC and specification compliance testing for each performance grade to be supplied. The lot size will depend upon the method of manufacture and may be designated on a tank basis, or on a time basis in the case of binders that are blended into trucks or tanks or that are continually blended into "live" tanks.

(c) For terminals or manufacturing facilities, the minimum reduced frequency of testing for QC or specification compliance shall be one series of tests every two weeks for "live" tanks or blenders and one series of tests every four weeks for "static" tanks that have had no material added between testing, per lot per grade of binder shipped.

(d) Quality Control testing may be used to determine that binders being shipped from terminals or manufacturing facilities have not been contaminated, provided that such testing is shown to be of sufficient accuracy to detect contamination and to assure that material meets required specifications. Surrogate tests may be used for QC testing of non-modified performance graded binders.

(e) Terminals or shipping facilities that blend performance graded binders from different sources, that blend to produce a different performance grade, or that blend to modify the properties of an existing performance grade shall perform complete AASHTO M 320 specification compliance testing.

(f) The shipping facility shall document that each transport vessel was inspected prior to loading and was found to be acceptable for the material being shipped. The inspection shall be documented by a statement on the bill of lading or truck ticket, or by maintaining a record of transport vessel inspections at the shipping facility, which shall be available for review by MoDOT.

1015.10.2.2 Quality Control Plan Test Data. The facility shall retain test data of specification compliance and QC testing for five years. At a minimum, the name of the facility, the dates of testing activity, results of individual specification compliance and QC tests identified by blender or tank number, and the mean, minimum and maximum test result for each specification compliance and QC test performed shall be readily available to MoDOT upon request.

1015.10.2.3 Approval of Laboratories. The supplier's primary testing laboratory shall be approved by MoDOT. The approval process will include split sample testing, and may include an on-site visit by department personnel. The primary testing laboratory shall be regularly inspected by the AASHTO Materials Reference Laboratory (AMRL). Any satellite testing laboratory operated by a supplier shall be inspected at the same frequency by the supplier's primary AMRL inspected laboratory staff, and a copy of the inspection report shall be forwarded to MoDOT.

1015.10.2.4 Failure to Comply. Failure to fulfill any of these requirements may result in disqualification of the performance graded binder supplier. If a primary manufacturing facility is disqualified, all terminals shipping performance graded binder manufactured at the primary facility and who are not performing AASHTO M 320 specification compliance testing will automatically be disqualified. In cases of dispute, test results obtained by MoDOT will be considered final.

1015.10.3 Characteristics. Performance graded asphalt binder shall be in accordance with AASHTO M 320 for the grade specified, except as follows. AASHTO T 111, *Inorganic Matter or Ash in Bituminous Materials*, may be substituted for AASHTO T 44, *Solubility of Bituminous Materials*, at the specification value indicated. The direct tension test will be waived. The following additional requirements will apply:

Binder Characteristics		
Absolute Temperature Spread Between Upper and Lower Temperature for PG Binder Grade[a]	**Elastic Recovery[b], Percent, Minimum, AASHTO T 301**	**Separation Test[c], Percent Difference, Maximum, ASTM D 5976**
86 C	-	-
92 C	55	10
98 C	65	10
104 C	75	10

[a]Temperature Spread = Upper PG Temperature minus Lower PG Temperature.
[b]Elastic recovery test to be performed on the residue from the Rolling Thin Film Oven Test at 25 C and 10 cm elongation.
[c]Separation test to be performed in accordance with ASTM D 5976, except test upper and lower portions as original binder for G* value according to AASHTO T 315.

1015.10.4 Storage. Performance graded asphalt binder shall be furnished as a uniform mixture shipped directly to the project site from the asphalt binder supplier's permanent plant address or intermediate storage facility, suitable for direct use. Asphalt binder shall be capable of being stored at the project site without separation or settling. Automatic blending will be allowed, except no intermediate blending of asphalt binder and any other modifiers will be allowed at the project site.

SECTION 1015.20 LIQUID BITUMINOUS MATERIAL

1015.20.1 Basis of Acceptance. Suppliers electing to furnish liquid bituminous material to MoDOT projects by QC/QA certification shall furnish material in accordance with Sec 1015.20.2. To become pre-qualified to furnish

material, a written request shall be submitted to Construction and Materials, along with a copy of the supplier's QC plan. For source approval for any supplier of liquid bituminous material, split samples and an on-site laboratory inspection may be required. A manufacturer may forgo a formal QC plan and elect to perform full compliance testing, and certify each batch of material. If a manufacturer elects to forgo a formal QC Plan, all truck shipments shall be loaded from approved storage tanks that have been sampled, tested and certified by the supplier. If a manufacturer so elects, and automatic blending equipment is used, blender material will be approved for use provided the finished product is in accordance with this specification. At least one complete specification compliance test shall be conducted every two weeks on each grade of material furnished for MoDOT work from the blender. A certified copy of the test results shall be furnished to the engineer. For all liquid bituminous material, AASHTO T 111, *Inorganic Matter or Ash in Bituminous Materials*, may be substituted for AASHTO T 44, *Solubility of Bituminous Materials*, at the specification value indicated.

1015.20.2 Quality Control Plan Requirements. The QC plan shall be in accordance with the following:

(a) The plan may be written to cover multiple terminals, shipping facilities, blending or manufacturing facilities.

(b) The plan shall state the location, organization and responsible personnel for each facility, including the physical address and telephone contact information. In general, following the guidelines in AASHTO R 26 will be acceptable.

(c) The plan shall state the minimum testing frequency for all material supplied. At a minimum, each grade of material supplied to MoDOT shall have complete specification compliance testing conducted monthly. Polymer modified material shall have complete specification compliance testing conducted every two weeks. The manufacturer's internal QC testing frequency shall be approved by MoDOT prior to implementation. The manufacturer shall perform sufficient tests and at a frequency to ensure specification compliant material is being supplied to MoDOT at all times. For emulsified asphalt, QC testing on each batch, at a minimum, shall consist of viscosity, sieve test, determination of residue by either distillation or evaporation and an identifier test, if applicable, for that particular grade, either cement mixing, particle charge or demusibility. The manufacturer may elect to perform additional QC tests. For cutback material, QC testing shall be a minimum of the viscosity on a daily basis when material is being shipped to MoDOT work.

(d) In the event of a failing sample, the manufacturer shall follow the steps outlined in AASHTO R 26, Sec. 9.2. If a sample fails to comply with any specification requirement at the Central Laboratory, the manufacturer may only ship new material of that grade after full specification compliance testing. After the manufacturer has certified through specification compliance testing that three consecutive batches are in accordance with the material specification, the manufacturer may return to the testing frequency outlined in the QC/QA plan. If a second sample of the same grade from the same facility fails to comply with any specification requirement within the same calendar year, approval of that facility to supply that grade under QC/QA may be withdrawn. If approval for a grade is withdrawn, that material may only be supplied to MoDOT work after full certification compliance testing has been performed at the Central Laboratory. Re-approval to supply under the supplier's QC/QA Plan will occur only after three consecutive batches meet specifications after testing at the Central Laboratory. Failure of multiple grades from a single facility tested at the Central Laboratory may result in that facility being removed from approval to supply material to MoDOT. Reinstatement will occur only after all materials in question have been tested at the Central Laboratory and have met all specifications, and documentation from the supplier outlining the reason for the failures and what corrective measures have been taken are to the satisfaction of MoDOT.

(e) The shipping facility shall document that each transport vessel was inspected prior to loading and was found to be acceptable for the material shipped. The inspection shall be documented by a statement on the bill of lading or truck ticket, or by maintaining a record of transport vessel inspections at the shipping facility, which shall be available for review by MoDOT.

The results of QC/QA testing shall be retained by the supplier for a period of three years. A report containing all test results for any material shall be available to MoDOT upon request.

1015.20.3 Type RC Liquid Asphalt. Type RC liquid asphalt shall be produced by fluxing an asphaltic base with suitable petroleum distillates. The material shall show no separation or curdling prior to use and shall not foam when heated to the application temperature. The material shall be in accordance with AASHTO M 81, invoking Note 3 using penetration in lieu of viscosity for the grade specified in the contract.

1015.20.4 Type MC Liquid Asphalt. Type MC liquid asphalt shall be produced by fluxing an asphaltic base with suitable petroleum distillates. The material shall show no separation or curdling prior to use and shall not foam when heated to the application temperature. The material shall be in accordance with AASHTO M 82, invoking Note 4 using penetration in lieu of viscosity for the grade specified in the contract.

1015.20.5 Emulsified Asphalt. Emulsified asphalt shall be in accordance with AASHTO M 140 or AASHTO M 208, for the type and grade specified in the contract.

1015.20.5.1 Polymer Modified Asphalt Emulsion. Bituminous material for polymer modified asphalt shall be in accordance with the following:

Polymer Modified Asphalt Emulsion				
Test [a]	**CRS-2P**		**EA-90P**	
	Min	**Max**	**Min**	**Max**
Viscosity, SSF @ 50 C	100	400	100	400
Storage Stability Test[b], 24 hour, percent	----	1	----	1
Classification Test	Pass	----	----	----
Particle Charge Test	Positive	----	----	----
Sieve Test, 850 µm mesh, percent	----	0.3	----	0.3
Demulsibility, 0.02 N $CaC1_2$, percent	----	----	30	----
Distillation:				
Oil distillate by volume of emulsion, percent	----	3	----	3
Residue from distillation[c] , percent	65	----	65	----
Tests on Residue from Distillation:				
Penetration, 25 C, 100 g, 5 sec	100	200	100	200
Ductility, 4 C, 5 cm/minute, cm	30	----	25	----
Ash[d] , percent	----	1	----	1
Float Test at 60 C, sec	----	----	1200	----
Elastic Recovery[e] , percent	58	----	58	----

[a]All tests shall be performed in accordance with AASHTO T 59 except as noted.

[b]In addition to AASHTO T 59, upon examination of the test cylinder, and after standing undisturbed for 24 hours, the surface shall show no appreciable white, milky colored substance and shall be a homogeneous brown color throughout.

[c]AASHTO T 59 shall be modified to maintain a 204° C ± 5° C maximum temperature for 15 minutes.

[d]Percent ash shall be determined in accordance with AASHTO T 111, *Ash in Bituminous Material*.

[e]Elastic recovery shall be determined as follows. Condition the ductilometer and samples to be treated at 10 C. Prepare the brass plate, mold and briquet specimen in accordance with AASHTO T 51. Keep the specimen at the specified test temperature of 10° C for 85 to 95 minutes. Immediately after conditioning, place the specimen in the ductilometer and proceed to elongate the sample to 20 cm at a rate of pull of 5 cm/min. After the 20 cm elongation has been reached, stop the ductilometer and hold the sample in the elongated position for 5 minutes. After 5 minutes, clip the sample approximately in half by means of scissors or other suitable cutting devices. Let the sample remain in the ductilometer in an undisturbed condition for one hour. At the end of this time period, retract the half sample specimen until the two broken ends touch. At this point note the elongation (x) in cm. Calculate the percent recovery by the following formula:

$$\% \text{ Recovery} = \frac{20 - X}{20} \times 100$$

1015.20.5.2 Asphalt Emulsion for Micro-Surfacing. Bituminous material for micro-surfacing shall be a polymer modified asphalt emulsion, grade CSS-lh, in accordance with the following table. The bituminous material shall show no separation after mixing. A minimum of 3.0 percent polymer content, by mass, of an approved polymer shall be milled into the asphalt emulsion at the time of manufacture of the emulsion. The emulsion shall be sampled in accordance with AASHTO T 40.

Micro-Surfacing Emulsion (MSE-1)			
	Min.	**Max.**	**Test Method**
Viscosity, Saybolt Furol at 25 C, s	20	100	AASHTO T 59
Storage stability test, 24 hr, percent	- -	1[a]	AASHTO T 59
Particle charge test positive[b]			AASHTO T 59
Sieve test, percent	- -	0.50	AASHTO T 59
Residue, percent	62	- -	AASHTO T 59
Tests on Residue from Distillation	**Min.**	**Max.**	**Test Method**
Penetration, 25 C, 100 g, 5 s,	40	90	AASHTO T49
Ductility, 25 C, 5cm/min, cm,	40	- -	AASHTO T 51
Solubility in Trichloroethylene, %	97.50	- -	AASHTO T 44

[a]The storage stability test may be waived provided the asphalt emulsion storage tank at the project site has adequate provisions for circulating the entire contents of the tank, and provided satisfactory field results are obtained.

[b]If the particle charge test is inconclusive, material having a maximum pH value of 6.7 will be acceptable.

1015.20.5.3 Scrub Seal Emulsion. Scrub seal emulsion shall be smooth and homogeneous, polymer modified, shall contain an asphalt rejuvenator and shall be in accordance with the following:

Scrub Seal Emulsion (SSE-1)			
	Min.	**Max.**	**Test Method**
Saybolt Furol Viscosity, SFS @ 25 C	30	100	AASHTO T 59
Storage Stability Test [a] , 24 hr., %	--	1[a]	AASHTO T 59
Demulsibility, 35 ml of 0.02N, $CACl_2$, %	--	60	AASHTO T 59
Sieve Test [b], percent	--	0.3	AASHTO T 59
Residue by Distillation [(c)] @ 205 ± 5 C, %	60	--	AASHTO T 59
Oil Distillate by Volume, percent	--	3	AASHTO T 59
Tests on Residue from Distillation	**Min.**	**Max.**	**Test Method**
Penetration @ 25 C, 5 s, 100 g, dmm	100	300	AASHTO T 49
Float Test @ 60 C, s	1200	--	AASHTO T 50
Ash, percent	--	1	AASHTO T 111
Elastic Recovery, 10 C, 200 mm elongation, 60 min. recovery, percent	30	--	ASTM D 5976
Saturates [d], percent	- -	20	ASTM D 4124

[a]Upon examination of the test cylinder after standing undisturbed for 24 hours, the surface shall show no white, milky colored substance and shall be a homogeneous brown color throughout.

[b]A percentage of 0.30 will be acceptable for samples taken at the point of use or shipped to the Central Laboratory for testing.

[c]ASTM D 244 shall be modified to include a 205 ± 5° C maximum temperature to be held for 15 minutes.

[d]ASTM D 4124 shall be modified to use Alumina, CG - 20 Grade, available from Aluminum Company of America, Pittsburgh, PA.

1015.20.6 Ultrathin Bonded Wearing Surface. Bituminous material for ultrathin bonded wearing surface shall be in accordance with the following.

1015.20.6.1 Asphalt Binder. The asphalt binder shall be in accordance with Sec 1015.10, and specifically as follows:

Tests	Method	Min.	Max.
Separation Test, %	AASHTO PP-5		10
Elastic Recovery Test, %	ASTM D 6084	65	

1015.20.6.2 Polymer Modified Emulsion Membrane. The anionic or cationic emulsion shall be polymer

modified and shall be in accordance with one of the following:

Anionic Polymer Modified Emulsion Membrane (PEM-1)				
Tests on Emulsion		**Method**	**Min.**	**Max.**
Viscosity, Saybolt Furol @122° F (50° C), s		AASHTO T 59	25	125
Storage Stability Test[a], 24 h, percent		AASHTO T 59		1
Sieve Test[b], percent		AASHTO T 59		0.3
Residue by Distillation[c], percent		AASHTO T 59	63	
Oil Distillate by Distillation, percent		AASHTO T 59		2
Demulsibilty, %	35 ml, 0.02 N $CaCl_2$	AASHTO T 59	60	
Tests on Residue From Distillation				
Penetration		AASHTO T 49	90	150
Elastic Recovery, percent		AASHTO T 301	60	

Cationic Polymer Modified Emulsion Membrane (CPEM-1)				
Tests on Emulsion		**Method**	**Min.**	**Max.**
Viscosity, Saybolt Furol @122°F (50° C), s		AASHTO T 59	25	125
Storage Stability Test[a], 24 h, percent		AASHTO T 59		1
Sieve Test[b], percent		AASHTO T 59		0.3
Residue by Distillation[c], percent		AASHTO T 59	63	
Oil Distillate by Distillation, percent		AASHTO T 59		2
Demulsibility, %	35 ml, 0.8% dioctyl sodium sulfosuccinate	AASHTO T 59	60	
Tests on Residue From Distillation				
Penetration		AASHTO T 49	90	150
Elastic Recovery, %		AASHTO T 301	60	

[a]After standing undisturbed for 24 hours, the surface shall show no white, milky colored substance, but shall be a smooth homogeneous color throughout.

[b]The sieve test will be waived if successful application of the material has been achieved in the field.

[c]AASHTO T 59 shall be modified to include a 400° F ± 10° F (205° C ± 5° C) maximum temperature to be held for a period of 15 minutes.

SECTION 1019 – CEMENT

Delete Sec 1019.2.1 and substitute the following: ***11/05***

1019.2.1 Portland Cement. All Portland cement shall be in accordance with AASHTO M 85. with the following modifications:

(a) Limestone addition: A maximum of 3.0% limestone by mass may be interground with the cement provided that the chemical and physical requirements are met. Only intergrind limestone that is naturally occurring, consisting of at least 70% by mass of one or more of the mineral forms of calcium carbonate. Calculate and report the limestone content in Portland cement on all mill reports as described in ASTM C150, Annex A1.

(b) Include the CO_2 content of Portland cement on all mill reports. Determine the CO_2 content in accordance with ASTM C114. When the CO_2 content exceeds 1.0% or when any quantity of limestone is added, report the C_3S as calculated in ASTM C150, Annex A1, using the actual CO_2 value.

Delete Sec 1019.2.3 and substitute the following: ***11/05***

1019.2.3 Blended Hydraulic Cement. All blended hydraulic cement shall be in accordance with Type IP, I(PM), IS or I(SM) of AASHTO M 240 with the modification that chemical composition shall be provided and tolerances checked in accordance with Section 7.2 of AASHTO M240.

SECTION 1020 – CORRUGATED METALLIC-COATED STEEL CULVERT PIPE, PIPE-ARCHES AND END SECTIONS

Delete Sec. 1020.2 and substitute the following: ***01/05***

1020.2 Basis of Acceptance. Unless otherwise specified, the basis of acceptance will be in accordance with AASHTO M 36. Pipe shall be from an approved qualified plant and will be accepted based on certification, manufacturer quality control documentation and tests on samples as required by the engineer. Pipe may be fabricated using English units of measurement. Pipe fabricated using English measurements shall be in accordance with the dimensions and tolerances shown on the plans.

Delete Sec. 1020.5.1 and substitute the following: ***01/05***

1020.5.1 Application for Placement on the Qualified List. For a plant to become qualified, a written request shall be sent by the manufacturer to Construction and Materials with the following information:

(a) A QC Plan, in accordance with Sec 1020.5.2, for each plant from which pipe is to be fabricated for use on MoDOT projects.

(b) A certification statement from the manufacturer that the quality control procedures at the plant, at a minimum, meet the requirements set forth in the manufacturer's QC Plan.

(c) Sources for each material to be used in the fabrication of pipe shall be provided.

(d) A guarantee that all material to be used in the fabrication of pipe will be in accordance with MoDOT specifications and that pre-approval for any source of material will be received prior to use.

(e) Units of measurement, English or metric, used to fabricate the pipe.

SECTION 1026 – REINFORCED CONCRETE CULVERT PIPE

Delete Sec 1026.4.1 and substitute the following: ***01/05***

1026.4.1 Application for Placement on Qualified List. To become qualified, a written request shall be sent by the manufacturer to Construction and Materials with the following information:

(a) A statement certifying that the quality control procedures at the plant meet the requirements set forth by the American Concrete Pipe Association (ACPA) Compliance Audit and Certification Program.

(b) Sources for each material to be used in the fabrication of pipe. For aggregate sources, the ledge the material is being taken from shall also be included.

(c) A guarantee that all material to be used in the fabrication of pipe will be in accordance with MoDOT specifications, and pre-approval for any source of material will be received prior to use.

(d) Units of measurement, English or metric, used to fabricate the pipe.

SECTION 1028 – CORRUGATED POLYVINYL CHLORIDE CULVERT PIPE

Delete Sec. 1028.4.1 and substitute the following: ***01/05***

1028.4.1 Application for Placement on Qualified List. To become qualified, a written request shall be sent by the manufacturer to Construction and Materials with the following:

(a) A QC plan for each plant from which pipe is to be fabricated for use on MoDOT projects. The QC plan shall be in accordance with Sec 1028.4.2, and shall provide that pipes be randomly selected for test by an independent testing laboratory, and that randomly selected pipes are representative of that manufacturer's pipe.

(b) A statement certifying that the quality control procedures at the plant, at a minimum, meet the requirements set forth in the manufacturer's QC plan.

(c) Sources for each material to be used in the fabrication of pipe.

(d) Certification that all pipe material to be used in the fabrication of pipe will be in accordance with MoDOT specifications.

(e) Units of measurement, English or metric, used to fabricate the pipe.

SECTION 1044 – POSTS FOR MARKERS AND DELINEATORS

Delete Sec 1044.3 – 1044.3.4.4 and substitute the following: ***11/05***

1044.3 Channel Post Delineator. Channel post for delineators shall be manufactured from ductile ASTM A 36 or ASTM A 1011 Gr 60 and as shown on the plans. Posts shall be hot dipped galvanized after manufacture in accordance with Sec 1080. Damaged coating shall be repaired in accordance with Sec 1081. The contractor shall furnish to the engineer three copies of the fabricator's certification that the material supplied is in accordance with the requirements specified.

SECTION 1047 – CURRUGATED POLYETHYLENE CULVERT PIPE

Amend Sec. 1047.3 to include the following: ***01/05***

1047.3.5 Pipe may be fabricated using English units of measurement. Pipe fabricated using English measurements shall meet the diameter dimensions shown on the plans. Pipe tolerances will be in accordance with AASHTO M 294.

Delete Sec. 1047.4.1 and substitute the following: ***01/05***

1047.4.1 Application for Placement on Qualified List. To become qualified, a written request shall be sent by the manufacturer to Construction and Materials, and shall include the following information:

(a) A copy of the manufacturer's PPI certification.

(b) The pipe manufacturer's certified analysis certificate setting forth the name or brand of pipe to be furnished, the specified type, category, grade and class of polyethylene compounds. The certificate shall be sworn for the manufacturer by a person having legal authority to bind the company. The certificate shall have attached a certified test report from an approved independent testing laboratory showing specific results of tests performed on each diameter pipe to be furnished, conforming to all requirements of these specifications. Pipes shall be randomly selected for test by the independent testing laboratory and shall be representative of that manufacturer's pipe.

(c) A guarantee that all pipe furnished shall be in accordance with the specification requirements, shall bear a suitable identification brand or mark and shall be replaced without cost to the Commission when not in accordance with the specified requirements. The guarantee shall be worded such that the guarantee will remain in effect as long as the manufacturer continues to furnish material. The manufacturer shall conduct tests and measurements as necessary to ensure the material produced complies with all specification requirements. These tests and measurements shall be identified by the identification symbols or code used on the pipe in a manner that will permit the manufacturer to produce specific reports showing test results representative of specific lots of polyethylene pipe. Copies of reports of these tests shall be kept on file and shall be submitted to the engineer upon request. The brand shall be removed or obliterated by the manufacturer on all material where control tests, as outlined herein, are not in accordance with this specification.

(d) Units of measurement, English or metric, used to fabricate the pipe.

SECTION 1048 – PAVEMENT MARKING MATERIAL

Rename Sec 1048.110 to the following: ***11/05***

SECTION 1048.110 HIGH BUILD ACRYLIC WATERBORNE PAVEMENT MARKING PAINT

Delete Sec 1048.110.2.2 and substitute the following: ***11/05***

1048.110.2.2 Acrylic Emulsion Polymer. The acrylic emulsion polymer used in the manufacture of the paint shall be Rohm & Haas HD-21, Dow DT400 or equal.

Delete Sec 1048.110.3.3 and substitute the following: ***11/05***

1048.110.3.3 The paint shall have the following physical properties:

Acrylic Waterborne Pavement Marking Paint Physical Properties	
Property	**Requirement**
Viscosity, 77 F (25 C), KU	83-98
Grind (Hegman Gage), minimum	3
Laboratory Dry Time, ASTM D 711, @ 15 mil, minutes, max.	10
Laboratory Dry Time, ASTM D 711, @ 25 mil, minutes, max.	25
Dry Through Time, minutes, max.	150

SECTION 1065 – DELINEATORS

Delete Sec 1065 and substitute the following: ***11/05***

SECTION 1065

DELINEATORS

1065.1 Scope. This specification covers delineators for use in highway construction.

1065.2 Guardrail, Median Barrier Delineator Body. The delineator body shall be manufactured from high-impact, weather-resistant plastic and final body thickness shall be a minimum of 0.08 inch (2.03 mm). Dimensions shall be as shown on the plans.

1065.3 Channel Post Delineator Body. The delineator body shall be flat sheet in accordance with Sec 1042 and dimensions as shown on the plans.

1065.4 Retroreflective Sheeting. The retroreflective sheeting shall be an approved MoDOT Type 7 sheeting in accordance with Sec 1042. Retroreflective sheeting shall be permanently affixed to the body of the delineator. Manufacturer's certification shall be provided for delineator sheeting.

SECTION 1081 – COATING OF STRUCTURAL STEEL

Delete Sec 1081.2 and substitute the following: ***04/05***

1081.2 Systems of Coatings. The required system and color or choice of systems and color will be specified on the plans. Each coat of the specified system shall be applied to all structural steel, unless the contract specifically delineates otherwise. The system and color of coating to be shop-applied shall be shown on the shop drawings. All coatings shall comply with local VOC (Volatile Organic Compound) regulations where the paint is applied. The system and color shall not vary for any portion of the entire structure, including material for field repairs, and shall be compatible products of a single manufacturer. The contractor shall coordinate the various items of work to ensure compliance with the requirements of this section. Approved material specification and dry film thickness for the coating systems shall be as indicated in the following table:

Paint Systems for Structural Steel		
System G (High Solids, Inorganic Zinc Silicate-Epoxy-Polyurethane)		
Coating	**Specification**	**Dry Film Thickness mils (µm)**
Prime Coat	Sec 1045.3	3.0 (75) min.-6 (150) max.
Epoxy Intermediate Coat	Sec 1045.4	3.0 (75) min.-5 (125) max.
Polyurethane Finish Coat, Gray or Brown	Sec 1045.5	2.0 (50) min.-4 (100) max.
System H (High Solids, Inorganic Zinc Silicate-Waterborne Acrylic Intermediate-Waterborne Acrylic Finish)		
Coating	**Specification**	**Dry Film Thickness mils (µm)**
Prime Coat	Sec 1045.3	3.0 (75) min.-6 (150) max.
Waterborne Acrylic, Intermediate Coat	Sec 1045.6	2.0 (50) min.-4 (100) max.
Waterborne Acrylic, Finish Coat, Gray or Brown	Sec 1045.6	2.0 (50) min.-4 (100) max.
Calcium Sulfonate System		
Coating	**Specification**	**Dry Film Thickness mils (µm)**
Calcium Sulfonate Rust Penetrating Sealer	Sec 1045.9.2	1.0 (25) min.
Calcium Sulfonate Primer	Sec 1045.9.3	4.0 (100) min.
Calcium Sulfonate Topcoat	Sec 1045.9.4	5.0 (125) min.
Aluminum & Gray Epoxy-Mastic Primer		
Coating	**Specification**	**Dry Film Thickness mils (µm)**
Aluminum Epoxy-Mastic Primer	Sec 1045.7	5.0 (125) min.
Gray Epoxy-Mastic Primer	Sec 1045.8	5.0 (125) min.

Amend Sec 1081 to include the following: ***04/05***

1081.7 Aluminum & Gray Epoxy-Mastic Primer.

1081.7.1 Scope. This specification covers the application of other approved primer coatings for touch-up and other repair applications.

1081.7.2 Surface Preparation. The epoxy-mastic shall be applied over an SSPC-SP2, SSPC-SP3 or SSPC-SP6 surface preparation, including removal of all rust scale, loose rust, loose mill scale and loose or non-adherent paint. Oil and grease shall be removed in accordance with SSPC-SP1 Solvent Cleaning. Areas adjacent to required areas will not be required to be masked to prevent overspray.

1081.7.3 Application. Material application methods, air and surface temperatures and relative humidity shall be in accordance with the manufacturer's written instructions and Sec 1081.3. The most restrictive application and environmental requirements for the epoxy-mastic shall be used when applying the primer to the steel.